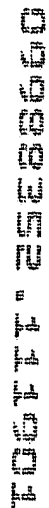
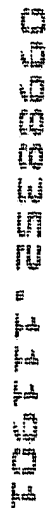
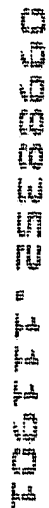


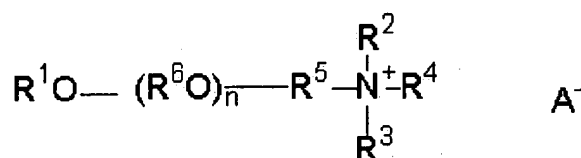
## WHAT IS CLAIMED IS:

1. An aqueous pesticidal concentrate microemulsion composition comprising:  
a water-soluble pesticide dissolved in an aqueous medium, the water-soluble  
pesticide being present in a concentration that is biologically effective when the  
composition is diluted in a suitable volume of water and applied to the foliage of a  
susceptible plant;  
a substantially water-immiscible organic solvent; and  
a surfactant component comprising one or more surfactants present in a  
concentration sufficient to provide acceptable temperature stability of the  
microemulsion such that the microemulsion has a cloud point of at least about 50°C  
and a crystallization point not greater than about -10°C, wherein the concentrate  
composition is optically transparent.
2. The composition of claim 1 wherein said surfactant component comprises one  
or more amine or quaternary ammonium salt compounds, each of which comprises  
an alkyl or aryl substituent having from about 4 to about 16 carbon atoms and not  
more than ten ethylene oxide linkages within the compound, said compounds being  
present in an amount which enhances the compatibility of said surfactant component  
with the herbicide and which provides an optically transparent composition.
3. The composition of claim 1 wherein the crystallization point is not greater than  
about -20°C.
4. The composition of claim 1 wherein the cloud point is at least about 60°C.
5. The composition of claim 1 wherein said surfactant component comprises one  
or more amine or quaternary ammonium salt compounds, each of which comprises  
an alkyl or aryl substituent having from about 4 to about 16 carbon atoms and not  
more than ten ethylene oxide linkages within the compound, said compounds being  
present in an amount which enhances the compatibility of said surfactant component  
with the herbicide.

[illegible][illegible][illegible][illegible][illegible]

$\frac{1}{n} \sum_{i=1}^n x_i$

[illegible]



(8)

5

wherein R<sup>1</sup> is linear or branched alkyl or aryl having from about 4 to about 16 carbon atoms, R<sup>2</sup> is hydrogen, methyl, ethyl, or -(CH<sub>2</sub>CH<sub>2</sub>O)<sub>x</sub>H, R<sup>3</sup> is hydrogen, methyl, ethyl, or -(CH<sub>2</sub>CH<sub>2</sub>O)<sub>y</sub>H wherein the sum of X and y is not more than about 5; R<sup>4</sup> is hydrogen or methyl; R<sup>6</sup> in each of the n (R<sup>6</sup>O) groups is independently C<sub>2</sub>-C<sub>4</sub> alkylene; R<sup>5</sup> is hydrocarbylene or substituted hydrocarbylene having from 2 to about 6 carbon atoms; and A<sup>-</sup> is an agriculturally acceptable anion.

10

7. The composition of claim 1 wherein the herbicide is glyphosate or a salt or ester thereof.

15

8. The composition of claim 7 wherein the glyphosate is predominantly in the form of the potassium, monoammonium, diammonium, sodium, monoethanolamine, n-propylamine, ethylamine, ethylenediamine, hexamethylenediamine or trimethylsulfonium salt thereof.

20

9. The composition of claim 8 wherein the glyphosate is predominantly in the form of the potassium salt thereof.

10. The composition of claim 1 wherein the composition is stable after storage at 50°C for at least 14 days.

TOPT-252800

11. The composition of claim 10 wherein the composition is stable after storage at 50°C for about 28 days.

5 12. The composition of claim 1 wherein the composition has a viscosity of less than about 1000 centipoise at 0°C at 45/s shear rate.

13. The composition of claim 12 wherein the composition has a viscosity of less than about 700 centipoise at 0°C at 45/s shear rate.

10 14. The composition of claim 13 wherein the composition has a viscosity of less than about 400 centipoise at 0°C at 45/s shear rate.

15. The composition of claim 14 wherein the composition has a viscosity of less than about 225 centipoise at 0°C at 45/s shear rate.

15 16. The composition of claim 1 wherein said surfactant component is selected such that the composition exhibits no crystallization of said herbicide when stored at a temperature of about -20°C for a period of about 7 days.

17. The composition of claim 1 wherein said surfactant component is selected such that the composition exhibits no crystallization of said herbicide when stored at a temperature of about -10°C for a period of about 7 days.

20 18. The composition of claim 9 wherein said glyphosate, predominantly in the form of the potassium salt thereof, is in solution in said aqueous phase in an amount of about 310 to about 600 grams of acid equivalent per liter of the composition.

19. The composition of claim 18 wherein said glyphosate, predominantly in the form of the potassium salt thereof, is in solution in said aqueous phase in an amount of about 360 to about 600 grams of acid equivalent per liter of the composition.

FOOTER 258660

20. The composition of claim 19 wherein said glyphosate, predominantly in the form of the potassium salt thereof, is in solution in said aqueous phase in an amount of about 400 to about 600 grams of acid equivalent per liter of the composition.

21. The composition of claim 20 wherein the concentration of said glyphosate is  
5 from about 450 to about 600 grams of acid equivalent per liter of the composition.

22. The composition of claim 21 wherein the concentration of said glyphosate is from about 480 to about 600 grams of acid equivalent per liter of the composition.

23. The composition of claim 22 wherein the concentration of said glyphosate is from about 500 to about 600 grams of acid equivalent per liter of the composition.

10      24. The composition of claim 22 wherein the concentration of said glyphosate is  
from about 480 to about 580 grams of acid equivalent per liter of the composition.

25. The composition of claim 24 wherein the concentration of said glyphosate is from about 540 to about 600 grams of acid equivalent per liter of the composition.

26. The composition of claim 1 wherein the total amount of surfactant is from about  
15 20 to about 300 grams per liter of the composition.

27. The composition of claim 1 further including an additional water-soluble herbicide selected from the group consisting of acifluorfen, acrolein, amitrole, asulam, benazolin, bentazon, bialaphos, bromacil, bromoxynil, chloramben, chloroacetic acid, clopyralid, 2,4-D, 2,4-DB, dalapon, dicamba, dichlorprop, difenzoquat, diquat, endothall, fenac, fenoxaprop, flamprop, flumiclorac, fluoroglycofen, flupropanate, fomesafen, fosamine, glufosinate, imazameth, imazamethabenz, imazamox, imazapic, imazapyr, imazaquin, imazethapyr, ioxynil, MCPA, MCPB, mecoprop, methylarsonic acid, naptalam, nonanoic acid, paraquat, picloram, quinclorac, sulfamic acid, 2,3,6-TBA, TCA, triclopyr and water-soluble salts thereof.

28. The composition of claim 1 wherein the composition is substantially homogeneous upon storage at 50°C for one week.

29. The composition of claim 1 wherein said surfactant component comprises at least one cationic surfactant.

5 30. The composition of claim 29 wherein said surfactant component further comprises at least one nonionic surfactant.

31. A liquid herbicidal concentrate emulsion composition having a continuous aqueous phase and a discontinuous oil phase, the composition comprising:  
glyphosate predominantly in the form of the potassium, monoammonium,  
10 diammonium, sodium, monoethanolamine, n-propylamine, ethylamine, ethylenediamine, hexamethylenediamine or trimethylsulfonium salt thereof, in solution in said aqueous phase in a concentration that is biologically effective when the composition is diluted in a suitable volume of water to form an enhanced application mixture and applied to foliage of a susceptible plant;

15 an oil phase comprising a substantially water-immiscible organic solvent; and a surfactant component in solution or stable suspension, emulsion, or dispersion in said aqueous phase, comprising one or more surfactants present in a concentration sufficient to provide acceptable temperature stability of the emulsion such that the emulsion has a cloud point of at least about 50°C and a crystallization  
20 point not greater than about -10°C.

32. The composition of claim 31 wherein said surfactant component comprises one or more amine or quaternary ammonium salt compounds, each of which comprises an alkyl or aryl substituent having from about 4 to about 16 carbon atoms and not more than ten ethylene oxide linkages within the compound, said  
25 compounds being present in an amount which enhances the compatibility of said surfactant component with the herbicide and which provides an optically transparent composition.

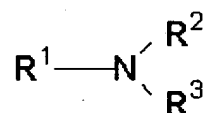
TOCTT 252660

33. The composition of claim 31 wherein the crystallization point is not greater than about -20°C.

34. The composition of claim 31 wherein the cloud point is at least about 60°C.

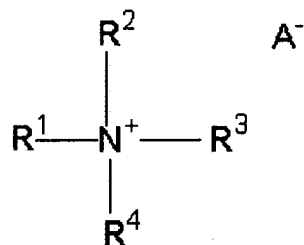
35. The composition of claim 31 wherein said surfactant component comprises one or more amine or quaternary ammonium salt compounds, each of which comprises an alkyl or aryl substituent having from about 4 to about 16 carbon atoms and not more than ten ethylene oxide linkages within the compound, said compounds being present in an amount which enhances the compatibility of said surfactant component with the herbicide.

36. The composition of claim 35 wherein said compounds are selected from the group consisting of amines or quaternary ammonium salts having the formula:



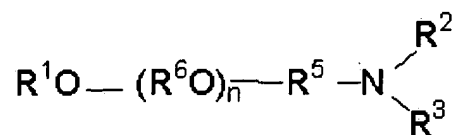
(5)

or



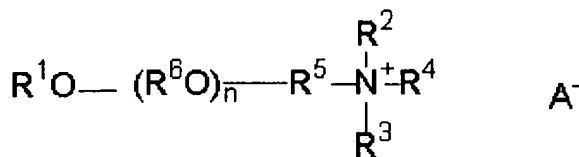
(6)

or



(7)

5 or



(8)

wherein R<sup>1</sup> is linear or branched alkyl or aryl having from about 4 to about 16 carbon atoms, R<sup>2</sup> is hydrogen, methyl, ethyl, or -(CH<sub>2</sub>CH<sub>2</sub>O)<sub>x</sub>H, R<sup>3</sup> is hydrogen, methyl, ethyl, or -(CH<sub>2</sub>CH<sub>2</sub>O)<sub>y</sub>H wherein the sum of X and y is not more than about 5; R<sup>4</sup> is hydrogen or methyl; R<sup>6</sup> in each of the n (R<sup>6</sup>O) groups is independently C<sub>2</sub>-C<sub>4</sub> alkylene; R<sup>5</sup> is hydrocarbylene or substituted hydrocarbylene having from 2 to about 6 carbon atoms; and A<sup>-</sup> is an agriculturally acceptable anion.

37. The composition of claim 31 wherein the glyphosate is predominantly in the form of the potassium, monoammonium, diammonium, sodium, monoethanolamine, n-propylamine, ethylamine, ethylenediamine, or hexamethylenediamine salt thereof.

38. The composition of claim 31 wherein said glyphosate is in solution in said aqueous phase in an amount of about 400 to about 600 grams of acid equivalent per liter of the composition.

39. The composition of claim 31 wherein said surfactant component comprises at least one cationic surfactant.



40. The composition of claim 39 wherein said surfactant component comprises at least one nonionic surfactant.

41. An aqueous pesticidal concentrate microemulsion composition comprising:  
a water-soluble pesticide dissolved in an aqueous medium, the water-soluble pesticide being present in a concentration that is biologically effective when the composition is diluted in a suitable volume of water and applied to the foliage of a susceptible plant;

a substantially water-immiscible organic solvent; and

a surfactant component comprising at least one cationic surfactant and at least one nonionic surfactant, the surfactant component being present in a concentration sufficient to provide acceptable temperature stability of the emulsion such that the emulsion has a cloud point of at least about 50°C and a crystallization point not greater than about -10°C.

42. The composition of claim 41 wherein said surfactant component comprises one or more amine or quaternary ammonium salt compounds, each of which comprises an alkyl or aryl substituent having from about 4 to about 16 carbon atoms and not more than ten ethylene oxide linkages within the compound, said compounds being present in an amount which enhances the compatibility of said surfactant component with the herbicide and which provides an optically transparent composition.

43. The composition of claim 41 wherein the crystallization point is not greater than about -20°C.

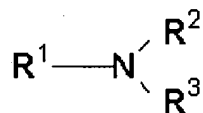
44. The composition of claim 41 wherein the cloud point is at least about 60°C.

45. The composition of claim 41 wherein said surfactant component comprises one or more amine or quaternary ammonium salt compounds, each of which comprises an alkyl or aryl substituent having from about 4 to about 16 carbon atoms and not more than ten ethylene oxide linkages within the compound, said

009855-11901

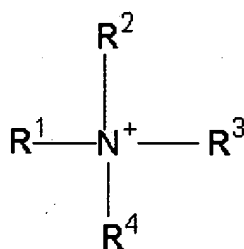
compounds being present in an amount which enhances the compatibility of said surfactant component with the herbicide.

46. The composition of claim 45 wherein said compounds are selected from the group consisting of amines or quaternary ammonium salts having the formula:



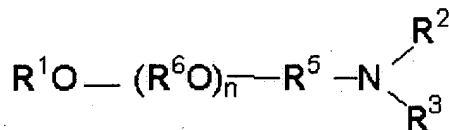
(5)

or



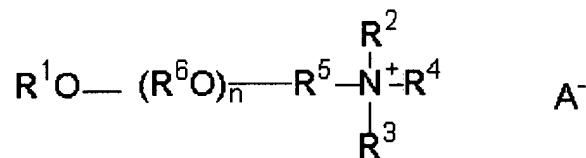
(6)

or



(7)

or



(8)

wherein R<sup>1</sup> is linear or branched alkyl or aryl having from about 4 to about 16 carbon atoms, R<sup>2</sup> is hydrogen, methyl, ethyl, or -(CH<sub>2</sub>CH<sub>2</sub>O)<sub>x</sub>H, R<sup>3</sup> is hydrogen, methyl, ethyl, or -(CH<sub>2</sub>CH<sub>2</sub>O)<sub>y</sub>H wherein the sum of X and y is not more than about 5; R<sup>4</sup> is hydrogen or methyl; R<sup>6</sup> in each of the n (R<sup>6</sup>O) groups is independently C<sub>2</sub>-C<sub>4</sub> alkylene; R<sup>5</sup> is hydrocarbylene or substituted hydrocarbylene having from 2 to about 6 carbon atoms; and A<sup>-</sup> is an agriculturally acceptable anion.

47. The composition of claim 41 wherein the herbicide is glyphosate or a salt or ester thereof.

48. The composition of claim 47 wherein the glyphosate is predominantly in the form of the potassium, monoammonium, diammonium, sodium, monoethanolamine, n-propylamine, ethylamine, ethylenediamine, hexamethylenediamine or trimethylsulfonium salt thereof.

49. The composition of claim 48 wherein the glyphosate is predominantly in the form of the potassium salt thereof.

50. The composition of claim 41 wherein the composition is stable after storage at 50°C for at least 14 days.

51. The composition of claim 50 wherein the composition is stable after storage at 50°C for about 28 days.

52. The composition of claim 41 wherein the composition has a viscosity of less than about 1000 centipoise at 0°C at 45/s shear rate.

53. The composition of claim 52 wherein the composition has a viscosity of less than about 700 centipoise at 0°C at 45/s shear rate.

5 54. The composition of claim 53 wherein the composition has a viscosity of less than about 400 centipoise at 0°C at 45/s shear rate.

55. The composition of claim 54 wherein the composition has a viscosity of less than about 225 centipoise at 0°C at 45/s shear rate.

10 56. The composition of claim 41 wherein said surfactant component is selected such that the composition exhibits no crystallization of said herbicide when stored at a temperature of about -20°C for a period of about 7 days.

15 57. The composition of claim 41 wherein said surfactant component is selected such that the composition exhibits no crystallization of said herbicide when stored at a temperature of about -10°C for a period of about 7 days.

58. The composition of claim 47 wherein said glyphosate is in solution in said aqueous phase in an amount of about 310 to about 600 grams of acid equivalent per liter of the composition.

20 59. The composition of claim 58 wherein the concentration of said glyphosate is from about 360 to about 600 grams of acid equivalent per liter of the composition.

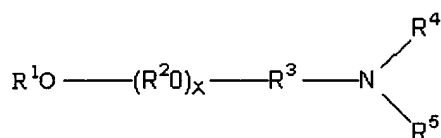
60. The composition of claim 59 wherein the concentration of said glyphosate is from about 400 to about 600 grams of acid equivalent per liter of the composition.

61. The composition of claim 41 wherein the total amount of surfactant is from about 20 to about 300 grams per liter of the composition.

TOPT " 52580

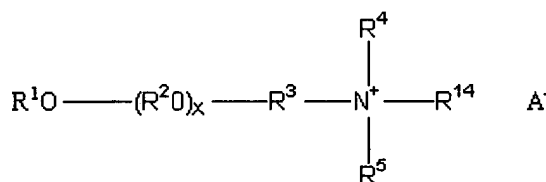
62. The composition of claim 41 wherein the composition is substantially homogeneous upon storage at 50°C for one week.

63. The composition of claim 41 wherein said cationic surfactant comprises  
(a) aminated alkoxyated alcohol having the formula:



(9)

or

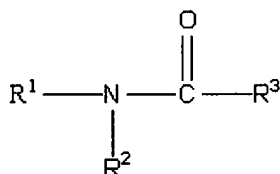


(10)

wherein R<sup>1</sup> is hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms; R<sup>2</sup> in each of the x (R<sup>2</sup>O) and y (R<sup>2</sup>O) groups is independently C<sub>2</sub>-C<sub>4</sub> alkylene; R<sup>3</sup> and R<sup>6</sup> are each independently hydrocarbylene or substituted hydrocarbylene having from 1 to about 6 carbon atoms; R<sup>4</sup> is hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, hydroxy substituted hydrocarbyl, -(R<sup>6</sup>)<sub>n</sub>-(R<sup>2</sup>O)<sub>y</sub>R<sup>7</sup>, -C(=NR<sup>11</sup>)NR<sup>12</sup>R<sup>13</sup>, -C(=O)NR<sup>12</sup>R<sup>13</sup>, -C(=S)NR<sup>12</sup>R<sup>13</sup> or together with R<sup>5</sup> and the nitrogen atom to which they are attached, form a cyclic or heterocyclic ring; R<sup>5</sup> is hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, hydroxy substituted hydrocarbyl, -(R<sup>6</sup>)<sub>n</sub>-(R<sup>2</sup>O)<sub>y</sub>R<sup>7</sup>, -C(=NR<sup>11</sup>)NR<sup>12</sup>R<sup>13</sup>, -C(=O)NR<sup>12</sup>R<sup>13</sup>, -C(=S)NR<sup>12</sup>R<sup>13</sup>, or together with R<sup>4</sup> and the nitrogen atom to which they are attached, form a cyclic or heterocyclic ring; R<sup>7</sup> is hydrogen or a linear or branched alkyl group having 1 to

about 4 carbon atoms;  $R^{11}$ ,  $R^{12}$  and  $R^{13}$  are hydrogen, hydrocarbyl or substituted hydrocarbyl,  $R^{14}$  is hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, hydroxy substituted hydrocarbyl,  $-(R^6)_n-(R^2O)_yR^7$ ,  $-C(=NR^{11})NR^{12}R^{13}$ ,  $-C(=O)NR^{12}R^{13}$ , or  $-C(=S)NR^{12}R^{13}$ ,  $n$  is 0 or 1,  $x$  and  $y$  are independently an average number from 1 to about 60, and  $A^-$  is an agriculturally acceptable anion;

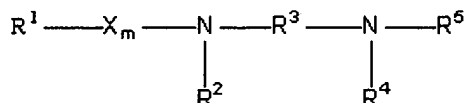
(b) hydroxylated amides having the formula:



(11)

wherein  $R^1$  is hydrocarbyl or substituted hydrocarbyl having from about 4 to about 30 carbon atoms,  $R^2$  is hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, and  $R^3$  is hydroxyalkyl, polyhydroxyalkyl, or poly(hydroxyalkyl)alkyl;

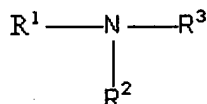
(c) diamines having the formula:



(9)

wherein  $R^1$ ,  $R^2$  and  $R^5$  are independently hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms or  $-R^8(OR^9)_nOR^{10}$ ,  $R^3$  is hydrocarbylene or substituted hydrocarbylene having from 2 to about 18 carbon atoms,  $R^8$  and  $R^9$  are individually hydrocarbylene or substituted hydrocarbylene having from 2 to about 4 carbon atoms,  $R^4$  and  $R^{10}$  are independently hydrogen or

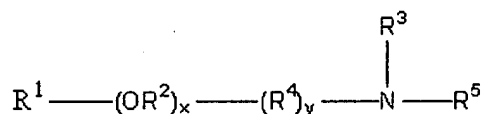




(16)

wherein R<sup>1</sup> is hydrocarbyl or substituted hydrocarbyl having from about 4 to about 30 carbon atoms or -R<sup>4</sup>OR<sup>5</sup>, R<sup>2</sup> is hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, R<sup>3</sup> is hydroxyalkyl, polyhydroxyalkyl, or poly(hydroxyalkyl)alkyl, R<sup>4</sup> is hydrocarbylene or substituted hydrocarbylene having from 2 to about 18 carbon atoms, and R<sup>5</sup> is hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms;

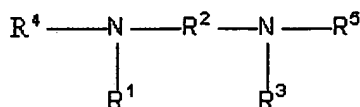
(f) alkoxyated poly(hydroxyalkyl)amines having the formula:



(19)

wherein R<sup>1</sup> and R<sup>3</sup> are independently hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, R<sup>2</sup> in each of the x (R<sup>2</sup>O) groups is independently C<sub>2</sub>-C<sub>4</sub> alkylene; R<sup>4</sup> is hydrocarbylene or substituted hydrocarbylene having from 1 to about 30 carbon atoms, R<sup>5</sup> is hydroxyalkyl, polyhydroxyalkyl, or poly(hydroxyalkyl)alkyl; x is an average number from 0 to about 30, and y is 0 or 1;

(g) di-poly(hydroxyalkyl)amine having the formula:

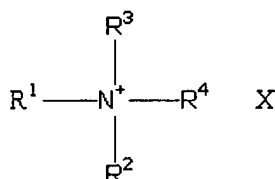


(22)



wherein R<sup>1</sup> and R<sup>3</sup> are independently hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 22 carbon atoms, R<sup>2</sup> is hydrocarbylene or substituted hydrocarbylene having from 2 to about 18 carbon atoms, and R<sup>4</sup> and R<sup>5</sup> are independently hydroxyalkyl, polyhydroxyalkyl, or poly(hydroxyalkyl)alkyl;

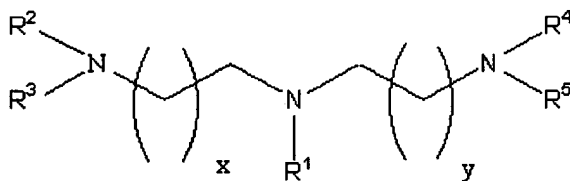
5 (h) quaternary poly(hydroxyalkyl)amine salts having the formula:



(24)

wherein R<sup>1</sup> is hydrocarbyl or substituted hydrocarbyl having from about 4 to about 30 carbon atoms or -X<sub>m</sub>-(R<sup>4</sup>O)<sub>y</sub>R<sup>5</sup>, R<sup>2</sup> and R<sup>3</sup> are independently hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, R<sup>4</sup> is hydroxyalkyl, polyhydroxyalkyl, or poly(hydroxyalkyl)alkyl, X- is an agriculturally acceptable anion; R<sup>4</sup> in each of the y(R<sup>4</sup>O) groups is independently C<sub>2</sub>-C<sub>4</sub> alkylene; R<sup>5</sup> is hydrogen or a linear or branched alkyl group having 1 to about 4 carbon atoms; X is hydrocarbylene or substituted hydrocarbylene having from 2 to about 18 carbon atoms; m is 0 or 1; and y is an average number from 0 to about 30

15 (i) triamines having the formula:

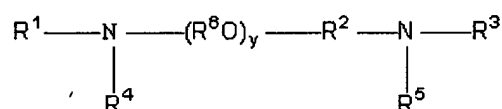


(27)

wherein R<sup>1</sup> is hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms; R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup> and R<sup>5</sup> are independently hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, or -(R<sup>6</sup>)<sub>s</sub>(R<sup>7</sup>O)<sub>n</sub>R<sup>6</sup>;

$R^6$  is hydrogen or a linear or branched alkyl group having from 1 to about 4 carbon atoms,  $R^7$  in each of the  $n$   $(R^7O)$  groups is independently  $C_2-C_4$  alkylene;  $R^8$  is hydrocarbylene or substituted hydrocarbylene having from 1 to about 6 carbon atoms,  $n$  is an average number from 1 to about 10,  $s$  is 0 or 1, and  $x$  and  $y$  are independently an integer from 1 to about 4;

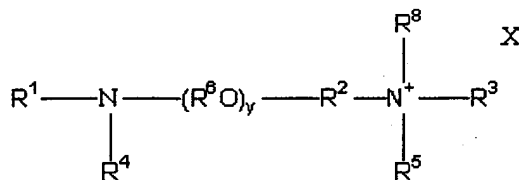
(j) diamines having the formula:



(28)

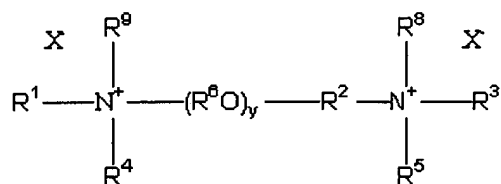
wherein  $R^1$ ,  $R^3$ ,  $R^4$  and  $R^5$  are independently hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, or  $-(R^6O)_xR^7$ ,  $R^2$  is hydrocarbylene or substituted hydrocarbylene having from 2 to about 30 carbon atoms,  $C(=NR^{11})NR^{12}R^{13}$ -,  $-C(=O)NR^{12}R^{13}$ -,  $-C(=S)NR^{12}R^{13}$ -,  $-C(=NR^{12})$ -,  $-C(S)$ -, or  $-C(O)$ -,  $R^6$  in each of the  $x$   $(R^6O)$  and  $y$   $(R^6O)$  groups is independently  $C_2-C_4$  alkylene,  $R^7$  is hydrogen, or a linear or branched alkyl group having from 1 to about 30 carbon atoms,  $R^{11}$ ,  $R^{12}$  and  $R^{13}$  are hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms,  $x$  is an average number from 1 to about 50, and  $y$  is an average number from 0 to about 60;

(k) mono- or di-quaternary ammonium salts having the formula:



(30)

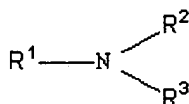
or



(29)

wherein  $\text{R}^1$ ,  $\text{R}^3$ ,  $\text{R}^4$ ,  $\text{R}^5$ ,  $\text{R}^8$  and  $\text{R}^9$  are independently hydrogen, polyhydroxyalkyl, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, or -  $(\text{R}^6\text{O})_x\text{R}^7$ ,  $\text{R}^2$  is hydrocarbylene or substituted hydrocarbylene having from 2 to about 30 carbon atoms,  $\text{R}^6$  in each of the  $x$   $(\text{R}^6\text{O})$  and  $y$   $(\text{R}^6\text{O})$  groups is independently  $\text{C}_2$ - $\text{C}_4$  alkylene,  $\text{R}^7$  is hydrogen, or a linear or branched alkyl group having from 1 to about 4 carbon atoms,  $x$  is an average number from 1 to about 30,  $y$  is an average number from about 3 to about 60, and  $\text{X}^-$  is an agriculturally acceptable anion;

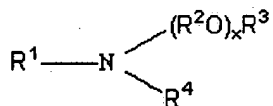
(l) a secondary or tertiary amine having the formula:



(31)

wherein  $\text{R}^1$  and  $\text{R}^2$  are hydrocarbyl having from 1 to about 30 carbon atoms, and  $\text{R}^3$  is hydrogen or hydrocarbyl having from 1 to about 30 carbon atoms;

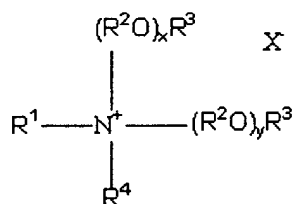
(m) monoalkylated amines having the formula:



(32)

wherein  $R^1$  and  $R^4$  are independently hydrocarbyl or substituted hydrocarbyl groups having from 1 to about 30 carbon atoms or  $-R^5SR^6$ ,  $R^2$  in each of the  $x$  ( $R^2O$ ) groups is independently  $C_2-C_4$  alkylene,  $R^3$  is hydrogen, or a linear or branched alkyl group having from 1 to about 4 carbon atoms,  $R^5$  is a linear or branched alkyl group having from about 6 to about 30 carbon atoms,  $R^6$  is a hydrocarbyl or substituted hydrocarbyl group having from 4 to about 15 carbon atoms and  $x$  is an average number from 1 to about 60;

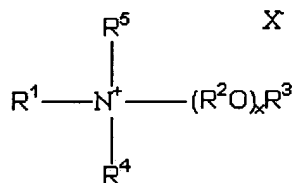
(n) dialkoxylated quaternary ammonium salts having the formula:



(33)

wherein  $R^1$  is hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms,  $R^2$  in each of the  $x$  ( $R^2O$ ) and  $y$  ( $R^2O$ ) groups is independently  $C_2-C_4$  alkylene,  $R^3$  is hydrogen, or a linear or branched alkyl group having from 1 to about 4 carbon atoms,  $R^4$  is hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms,  $x$  and  $y$  are independently an average number from 1 to about 40, and  $X^-$  is an agriculturally acceptable anion;

(o) monoalkoxylated quaternary ammonium salts having the formula:

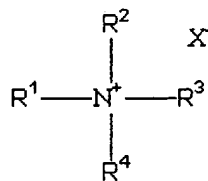


(34)

wherein  $R^1$  and  $R^5$  are independently hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms,  $R^4$  is hydrocarbyl or substituted

hydrocarbyl having from 1 to about 30 carbon atoms,  $R^2$  in each of the  $x$  ( $R^2O$ ) groups is independently  $C_2-C_4$  alkylene,  $R^3$  is hydrogen, or a linear or branched alkyl group having from 1 to about 30 carbon atoms,  $x$  is an average number from 1 to about 60, and  $X^-$  is an agriculturally acceptable anion;

5 (p) quaternary ammonium salts having the formula:

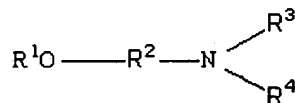


(35)

wherein  $R^1$ ,  $R^3$  and  $R^4$  are independently hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms,  $R^2$  is hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, and  $X^-$  is an agriculturally acceptable anion;

10

(q) etheramines having the formula:



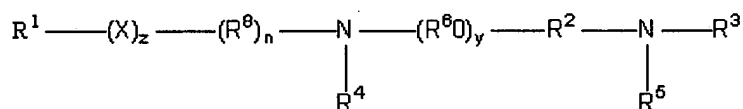
(36)

wherein  $R^1$  is hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms;  $R^2$  is hydrocarbylene or substituted hydrocarbylene having from 2 to about 30 carbon atoms;  $R^3$  and  $R^4$  are independently hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, or  $-(R^5O)_xR^6$ ,  $R^5$  in each of the  $x(R^5O)$  groups is independently  $C_2-C_4$  alkylene,  $R^6$  is hydrogen, or a

15

linear or branched alkyl group having from 1 to about 4 carbon atoms, and x is an average number from 1 to about 50;

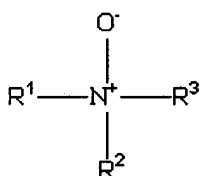
(r) diamines having the formula:



(37)

- 5 wherein R<sup>1</sup>, R<sup>3</sup>, R<sup>4</sup> and R<sup>5</sup> are independently hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, or -(R<sup>6</sup>O)<sub>x</sub>R<sup>7</sup>; R<sup>2</sup> and R<sup>8</sup> are independently hydrocarbylene or substituted hydrocarbylene having from 2 to about 30 carbon atoms, R<sup>6</sup> in each of the x (R<sup>6</sup>O) and y (R<sup>6</sup>O) groups is independently C<sub>2</sub>-C<sub>4</sub> alkylene, R<sup>7</sup> is hydrogen, or a linear or branched alkyl group having from 1 to about 30 carbon atoms, x is an average number from 1 to about 30, X is -O-, -N(R<sup>6</sup>)-, -C(O)-, -C(O)O-, -OC(O)-, -N(R<sup>9</sup>)C(O)-, -C(O)N(R<sup>9</sup>)-, -S-, -SO-, or -SO<sub>2</sub>-, y is 0 or an average number from 1 to about 30, n and z are independently 0 or 1, and R<sup>9</sup> is hydrogen or hydrocarbyl or substituted hydrocarbyl;

(s) amine oxides having the formula:

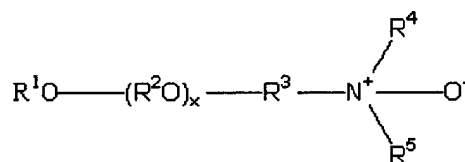


(38)

15 wherein R<sup>1</sup>, R<sup>2</sup> and R<sup>3</sup> are independently hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, -(R<sup>4</sup>O)<sub>x</sub>R<sup>5</sup>, or -R<sup>6</sup>(OR<sup>4</sup>)<sub>x</sub>OR<sup>5</sup>; R<sup>4</sup> in each of the x (R<sup>4</sup>O) groups is independently C<sub>2</sub>-C<sub>4</sub> alkylene, R<sup>5</sup> is hydrogen, or a hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, R<sup>6</sup> is a hydrocarbylene or substituted hydrocarbylene having from 1 to about 6 carbon

atoms, x is an average number from 1 to about 50, and the total number of carbon atoms in R<sup>1</sup>, R<sup>2</sup> and R<sup>3</sup> is at least 8;

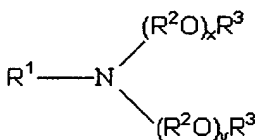
(t) alkoxyated amine oxides having the formula:



(39)

5 wherein R<sup>1</sup> is hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms; R<sup>2</sup> in each of the x (R<sup>2</sup>O) and y (R<sup>2</sup>O) groups is independently C<sub>2</sub>-C<sub>4</sub> alkylene; R<sup>3</sup> is a hydrocarbylene or substituted hydrocarbylene having from 2 to about 6 carbon atoms; R<sup>4</sup> and R<sup>5</sup> are each independently hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, -  
10 (R<sup>6</sup>)<sub>n</sub>-(R<sup>2</sup>O)<sub>y</sub>R<sup>7</sup>; R<sup>6</sup> is hydrocarbylene or substituted hydrocarbylene containing from 1 to about 6 carbon atoms, R<sup>7</sup> is hydrogen or a linear or branched alkyl group having 1 to about 4 carbon atoms, n is 0 or 1, and x and y are independently an average number from 1 to about 60;

(u) dialkoxyated amines having the formula:

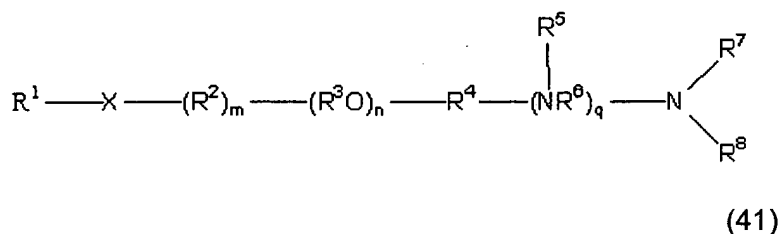


(40)

15 wherein R<sup>1</sup> is hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, -R<sup>4</sup>SR<sup>5</sup>, or -(R<sup>2</sup>O)<sub>z</sub>R<sup>3</sup>, R<sup>2</sup> in each of the x (R<sup>2</sup>O), y (R<sup>2</sup>O) and z (R<sup>2</sup>O) groups is independently C<sub>2</sub>-C<sub>4</sub> alkylene, R<sup>3</sup> is hydrogen, or a linear or  
20 branched alkyl group having from 1 to about 22 carbon atoms, R<sup>4</sup> is a linear or branched alkyl group having from about 6 to about 30 carbon atoms, R<sup>5</sup> is a linear or branched alkyl group having from about 4 to about 15 carbon atoms, and x, y and z are independently an average number from 1 to about 40, provided, however, that

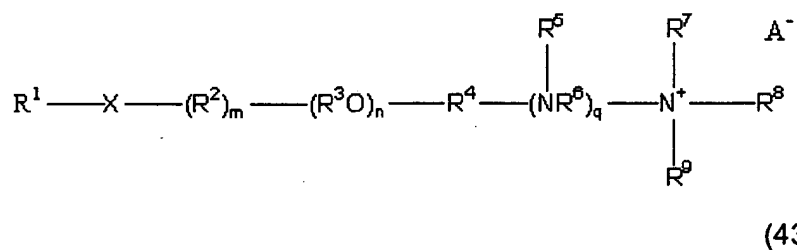
when R<sup>1</sup> is alkyl, either the sum of x and y is greater than 20 or R<sup>3</sup> is other than hydrogen;

(v) aminated alkoxyated alcohols having the following chemical structure:



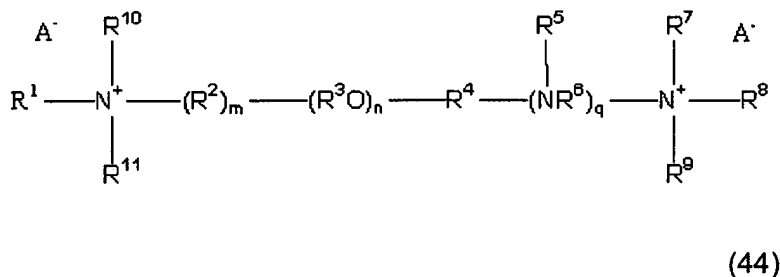
- 5 wherein R<sup>1</sup>, R<sup>7</sup>, R<sup>8</sup>, and R<sup>9</sup> are each independently hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, or -(R<sup>11</sup>)<sub>s</sub>(R<sup>3</sup>O)<sub>v</sub>R<sup>10</sup>; X is -O-, -OC(O)-, -C(O)O-, -N(R<sup>12</sup>)C(O)-, -C(O)N(R<sup>12</sup>)-, -S-, -SO-, -SO<sub>2</sub>- or -N(R<sup>9</sup>)-; R<sup>3</sup> in each of the n (R<sup>3</sup>O) groups and the v (R<sup>3</sup>O) groups is independently C<sub>2</sub>-C<sub>4</sub> alkylene; R<sup>10</sup> is hydrogen, or a linear or branched alkyl group having from 1 to about  
10 30 carbon atoms; n is an average number from 1 to about 60; v is an average number from 1 to about 50; R<sup>2</sup> and R<sup>11</sup> are each independently hydrocarbylene or substituted hydrocarbylene having from 1 to about 6 carbon atoms; R<sup>4</sup> is hydrocarbylene or substituted hydrocarbylene having from 2 to about 6 carbon atoms; R<sup>12</sup> is hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to  
15 about 30 carbon atoms; m and s are each independently 0 or 1; R<sup>6</sup> is hydrocarbylene or substituted hydrocarbylene having from 2 to about 30 carbon atoms, -C(=NR<sup>12</sup>)-, -C(S)-, or -C(O)-; q is an integer from 0 to 5; and R<sup>5</sup> is hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms;

- 20 (w) a quaternary ammonium, sulfonium or sulfoxonium salt having the following chemical structure:

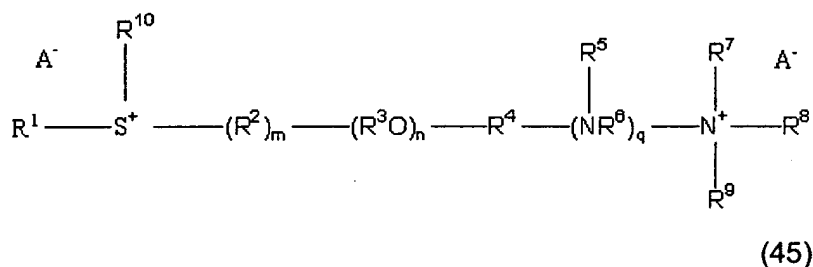




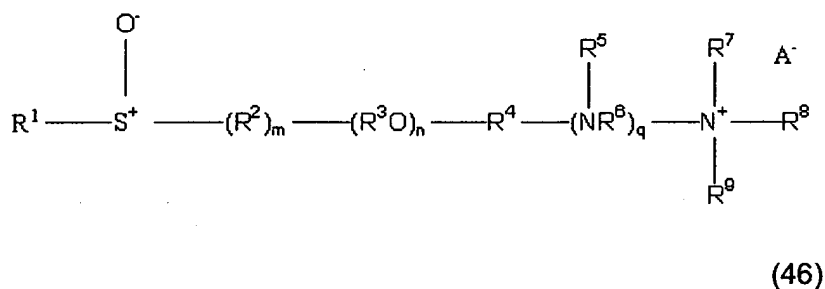
or



or



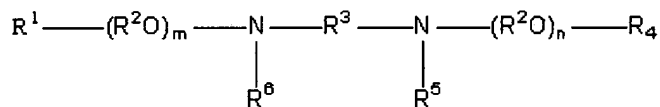
or



- wherein  $\text{R}^1$ ,  $\text{R}^7$ ,  $\text{R}^8$ ,  $\text{R}^9$ ,  $\text{R}^{10}$  and  $\text{R}^{11}$  are independently hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, or  $-(\text{R}^{13})_s(\text{R}^3\text{O})_v\text{R}^{12}$ ;  $\text{X}$  is  $-\text{O}-$ ,  $-\text{OC}(\text{O})-$ ,  $-\text{N}(\text{R}^{14})\text{C}(\text{O})-$ ,  $-\text{C}(\text{O})\text{N}(\text{R}^{14})-$ ,  $-\text{C}(\text{O})\text{O}-$ , or  $-\text{S}-$ ;  $\text{R}^3$  in each of the  $n$   $(\text{R}^3\text{O})$  groups and  $v$   $(\text{R}^3\text{O})$  groups is independently  $\text{C}_2$ - $\text{C}_4$  alkylene;  $\text{R}^{12}$  is hydrogen, or a linear or branched alkyl group having from 1 to about 30 carbon atoms;  $n$  is an average number from 1 to about 60;  $v$  is an average number from 1 to about 50;  $\text{R}^2$  and  $\text{R}^{13}$  are each independently hydrocarbylene or substituted hydrocarbylene

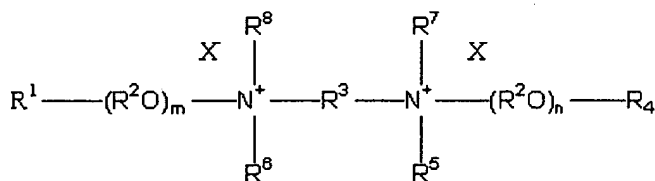
having from 1 to about 6 carbon atoms; m and s are each independently 0 or 1; R<sup>4</sup> is hydrocarbylene or substituted hydrocarbylene having from 2 to about 6 carbon atoms; R<sup>6</sup> is hydrocarbylene or substituted hydrocarbylene having from 2 to about 30 carbon atoms, -C(=NR<sup>12</sup>)-, -C(S)-, or -C(O)-; R<sup>14</sup> is hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, q is an integer from 0 to 5; R<sup>5</sup> is hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms; and each A<sup>-</sup> is an agriculturally acceptable anion;

(x) a diamine or diammonium salt having the formula:



(47)

or



(48)

wherein R<sup>1</sup>, R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup>, R<sup>7</sup> and R<sup>8</sup> are independently hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, R<sup>2</sup> in each of the m (R<sup>2</sup>O) and n (R<sup>2</sup>O) groups and R<sup>9</sup> are independently C<sub>2</sub>-C<sub>4</sub> alkylene, R<sup>3</sup> is hydrocarbylene or substituted hydrocarbylene having from about 2 to about 6 carbon atoms or -(R<sup>2</sup>O)<sub>p</sub>R<sub>9</sub>-, m and n are individually an average number from 0 to about 50, and p is an average number from 0 to about 60; or

(y) a compound of the formula:

**SECRET**

39-21(52580)  
PATENT



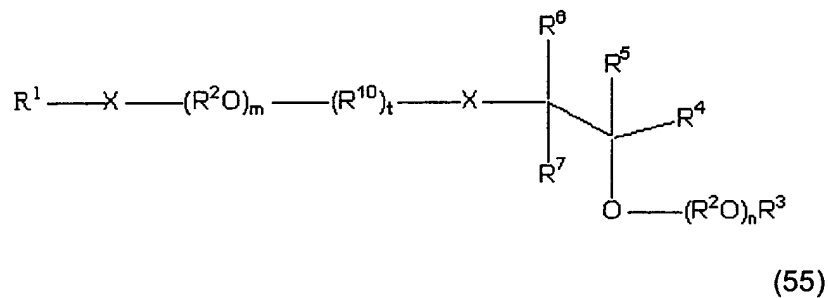
5



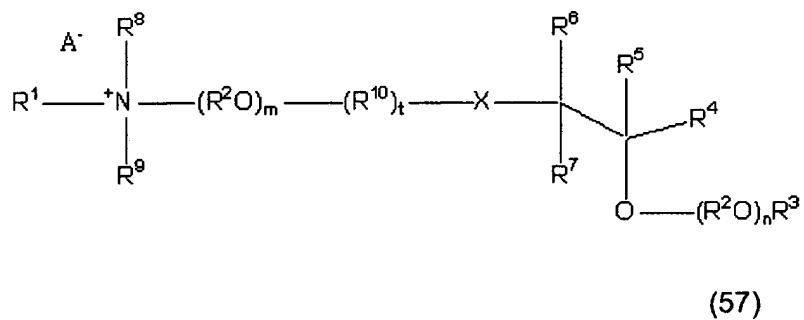
or



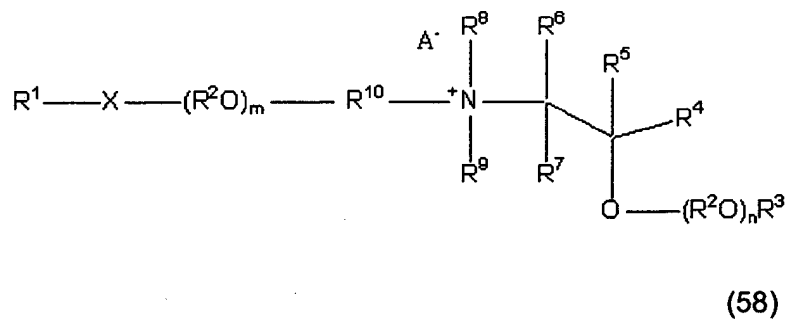
or



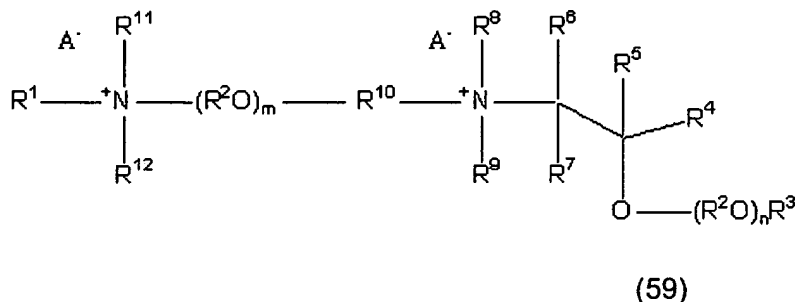
or



or



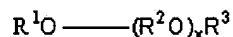
or



wherein  $\text{R}^1$ ,  $\text{R}^9$ , and  $\text{R}^{12}$  are independently hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, or  $-(\text{R}^2\text{O})_p\text{R}^{13}$ ;  $\text{R}^2$  in each of the  $m$   $(\text{R}^2\text{O})$ ,  $n$   $(\text{R}^2\text{O})$ ,  $p$   $(\text{R}^2\text{O})$  and  $q$   $(\text{R}^2\text{O})$  groups is independently  $\text{C}_2$ - $\text{C}_4$  alkylene;  $\text{R}^3$ ,  $\text{R}^8$ ,  $\text{R}^{11}$ ,  $\text{R}^{13}$  and  $\text{R}^{15}$  are independently hydrogen, or a hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms;  $\text{R}^4$  is  $-(\text{CH}_2)_y\text{OR}^{13}$  or  $-(\text{CH}_2)_y\text{O}(\text{R}^2\text{O})_q\text{R}^3$ ;  $\text{R}^5$ ,  $\text{R}^6$  and  $\text{R}^7$  are independently hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, or  $\text{R}^4$ ;  $\text{R}^{10}$  is hydrocarbylene or substituted hydrocarbylene having from 2 to about 30 carbon atoms;  $\text{R}^{14}$  is hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, or  $-(\text{CH}_2)_z\text{O}(\text{R}^2\text{O})_p\text{R}^3$ ;  $m$ ,  $n$ ,  $p$  and  $q$  are independently an average number from 1 to about 50;  $\text{X}$  is independently  $-\text{O}-$ ,  $-\text{N}(\text{R}^{14})-$ ,  $-\text{C}(\text{O})-$ ,  $-\text{C}(\text{O})\text{O}-$ ,  $-\text{OC}(\text{O})-$ ,  $-\text{N}(\text{R}^{15})\text{C}(\text{O})-$ ,  $-\text{C}(\text{O})\text{N}(\text{R}^{15})-$ ,  $-\text{S}-$ ,  $-\text{SO}-$ , or  $-\text{SO}_2-$ ;  $t$  is 0 or 1;  $\text{A}^-$  is an agriculturally acceptable anion; and  $y$  and  $z$  are independently an integer from 0 to about 30.

64. The composition of claim 63 wherein said nonionic surfactant comprises

(a) an alkoxyated alcohol having the formula:

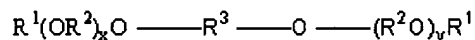


(49)

wherein  $\text{R}^1$  is hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms,  $\text{R}^2$  in each of the  $x$   $(\text{R}^2\text{O})$  groups is independently  $\text{C}_2$ - $\text{C}_4$  alkylene,  $\text{R}^3$

is hydrogen, or a linear or branched alkyl group having from 1 to about 4 carbon atoms, and x is an average number from 1 to about 60;

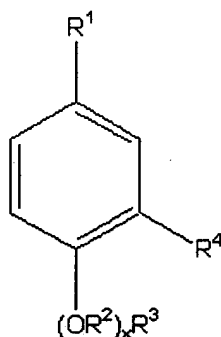
(b) dialkoxylated alcohols having the formula:



(50)

5 wherein  $R^1$  is independently hydrogen, or a linear or branched alkyl group having from 1 to about 4 carbon atoms,  $R^2$  in each of the x ( $R^2O$ ) and the y ( $R^2O$ ) groups is independently  $C_2-C_4$  alkylene,  $R^3$  is hydrocarbylene or substituted hydrocarbylene having from 2 to about 30 carbon atoms, and x and y are independently an average number from 1 to about 60; or

10 (c) alkoxyated dialkylphenols having the formula:



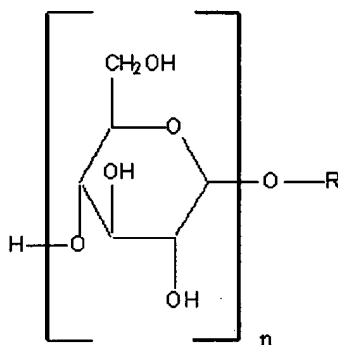
(51)

15

wherein  $R^1$  and  $R^4$  are independently hydrogen, or a linear or branched alkyl group having from 1 to about 30 carbon atoms and at least one of  $R^1$  and  $R^4$  is an alkyl group,  $R^2$  in each of the x ( $R^2O$ ) groups is independently  $C_2-C_4$  alkylene,  $R^3$  is

hydrogen, or a linear or branched alkyl group having from 1 to about 4 carbon atoms, and x is an average number from 1 to about 60; or

(d) a glycoside having the formula:



(61)

wherein n is the degree of polymerization, or number of glucose groups, and R is a branched or straight chain alkyl group preferably having from 4 to 18 carbon atoms, or a mixture of alkyl groups having an average value within the given range.

65. A liquid herbicidal concentrate emulsion composition having a continuous aqueous phase and a discontinuous oil phase, the composition comprising:

(i) a water-soluble herbicide dissolved in said aqueous phase, the water-soluble herbicide being present in a concentration that is biologically effective when the composition is diluted in a suitable volume of water and applied to the foliage of a susceptible plant;

(iii) an oil phase comprising a substantially water-immiscible organic solvent; and

(iv) a surfactant component comprising at least one cationic surfactant, the surfactant component being present in a concentration sufficient to provide acceptable temperature stability of the emulsion such that the emulsion has a cloud point of at least about 50°C and a crystallization point not greater than about 0°C.

66. The composition of claim 65 wherein the cloud point is at least about 60°C.

67. The composition of claim 65 wherein the herbicide is glyphosate or a salt or ester thereof.

5 68. The composition of claim 67 wherein the glyphosate is predominantly in the form of the potassium, monoammonium, diammonium, sodium, monoethanolamine, n-propylamine, ethylamine, ethylenediamine, hexamethylenediamine or trimethylsulfonium salt thereof.

69. The composition of claim 68 wherein the glyphosate is predominantly in the form of the potassium salt thereof.

10 70. The composition of claim 65 wherein the composition is stable after storage at 50°C for at least 14 days.

71. The composition of claim 65 wherein the composition is stable after storage at 50°C for about 28 days.

15 72. The composition of claim 65 wherein the composition has a viscosity of less than about 1000 centipoise at 0°C at 45/s shear rate.

73. The composition of claim 65 wherein said surfactant component is selected such that the composition exhibits no crystallization of said herbicide when stored at a temperature of about 0°C for a period of about 7 days.

20 74. The composition of claim 65 wherein said glyphosate is in solution in said aqueous phase in an amount of about 310 to about 600 grams of acid equivalent per liter of the composition.

FOOTER 250000



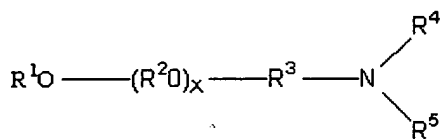
75. The composition of claim 74 wherein said glyphosate is in solution in said aqueous phase in an amount of about 360 to about 600 grams of acid equivalent per liter of the composition.

5 76. The composition of claim 75 wherein said glyphosate, predominantly in the form of the potassium salt thereof, is in solution in said aqueous phase in an amount of about 400 to about 600 grams of acid equivalent per liter of the composition.

77. The composition of claim 65 wherein the total amount of surfactant is from about 20 to about 300 grams per liter of the composition.

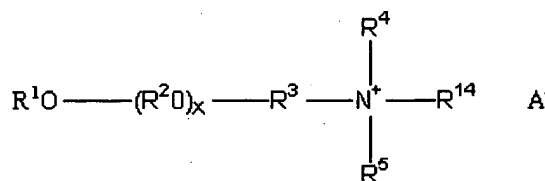
10 78. The composition of claim 65 wherein the composition is substantially homogeneous upon storage at 50°C for one week.

79. The composition of claim 65 wherein said cationic surfactant comprises (a) aminated alkoxyated alcohol having the formula:



(9)

15 or



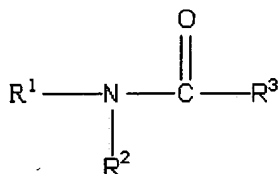
(10)

wherein R<sup>1</sup> is hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms; R<sup>2</sup> in each of the x (R<sup>2</sup>O) and y (R<sup>2</sup>O) groups is

09989252-11001

independently C<sub>2</sub>-C<sub>4</sub> alkylene; R<sup>3</sup> and R<sup>6</sup> are each independently hydrocarbylene or substituted hydrocarbylene having from 1 to about 6 carbon atoms; R<sup>4</sup> is hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, hydroxy substituted hydrocarbyl, -(R<sup>6</sup>)<sub>n</sub>-(R<sup>2</sup>O)<sub>y</sub>R<sup>7</sup>, -C(=NR<sup>11</sup>)NR<sup>12</sup>R<sup>13</sup>, -C(=O)NR<sup>12</sup>R<sup>13</sup>,  
 5 -C(=S)NR<sup>12</sup>R<sup>13</sup> or together with R<sup>5</sup> and the nitrogen atom to which they are attached, form a cyclic or heterocyclic ring; R<sup>5</sup> is hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, hydroxy substituted hydrocarbyl, -(R<sup>6</sup>)<sub>n</sub>-(R<sup>2</sup>O)<sub>y</sub>R<sup>7</sup>, -C(=NR<sup>11</sup>)NR<sup>12</sup>R<sup>13</sup>, -C(=O)NR<sup>12</sup>R<sup>13</sup>, -C(=S)NR<sup>12</sup>R<sup>13</sup>, or together with R<sup>4</sup> and the nitrogen atom to which they are attached, form a cyclic or  
 10 heterocyclic ring; R<sup>7</sup> is hydrogen or a linear or branched alkyl group having 1 to about 4 carbon atoms; R<sup>11</sup>, R<sup>12</sup> and R<sup>13</sup> are hydrogen, hydrocarbyl or substituted hydrocarbyl, R<sup>14</sup> is hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, hydroxy substituted hydrocarbyl, -(R<sup>6</sup>)<sub>n</sub>-(R<sup>2</sup>O)<sub>y</sub>R<sup>7</sup>, -C(=NR<sup>11</sup>)NR<sup>12</sup>R<sup>13</sup>, -C(=O)NR<sup>12</sup>R<sup>13</sup>, or -C(=S)NR<sup>12</sup>R<sup>13</sup>, n is 0 or 1, x and y are  
 15 independently an average number from 1 to about 60, and A- is an agriculturally acceptable anion;

(b) hydroxylated amides having the formula:



(11)

wherein R<sup>1</sup> is hydrocarbyl or substituted hydrocarbyl having from about 4 to about 30 carbon atoms, R<sup>2</sup> is hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, and R<sup>3</sup> is hydroxyalkyl, polyhydroxyalkyl, or  
 25 poly(hydroxyalkyl)alkyl;

(c) diamines having the formula:



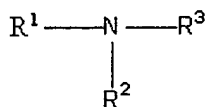
(d) mono- or di-ammonium salts having the formula:



or



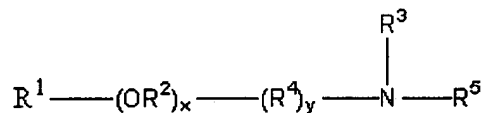
- wherein  $R^1$ ,  $R^2$ ,  $R^4$ ,  $R^5$  and  $R^7$  are independently hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms or  $-R^8(OR^9)_nOR^{10}$ ,  $R^6$  is hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms,  $R^3$  is hydrocarbylene or substituted hydrocarbylene having from 2 to about 30 carbon atoms,  $R^8$  and  $R^9$  are individually hydrocarbylene or substituted hydrocarbylene having from 2 to about 4 carbon atoms,  $R^{10}$  is hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms,  $m$  is 0 or 1,  $n$  is an average number from 0 to about 40,  $X$  is  $-C(O)-$  or  $-SO_2-$ ,  $Z$  is  $-C(O)-$ , and  $A^-$  is an agriculturally acceptable anion;
- (e) poly(hydroxyalkyl)amines having the formula:



(16)

- wherein  $R^1$  is hydrocarbyl or substituted hydrocarbyl having from about 4 to about 30 carbon atoms or  $-R^4OR^5$ ,  $R^2$  is hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms,  $R^3$  is hydroxyalkyl, polyhydroxyalkyl, or poly(hydroxyalkyl)alkyl,  $R^4$  is hydrocarbylene or substituted hydrocarbylene having from 2 to about 18 carbon atoms, and  $R^5$  is hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms;

(f) alkoxyated poly(hydroxyalkyl)amines having the formula:

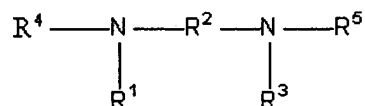


(19)

wherein  $R^1$  and  $R^3$  are independently hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms,  $R^2$  in each of the  $x$  ( $R^2O$ ) groups is independently  $C_2$ - $C_4$  alkylene;  $R^4$  is hydrocarbylene or substituted

hydrocarbylene having from 1 to about 30 carbon atoms,  $R^5$  is hydroxyalkyl, polyhydroxyalkyl, or poly(hydroxyalkyl)alkyl;  $x$  is an average number from 0 to about 30, and  $y$  is 0 or 1;

(g) di-poly(hydroxyalkyl)amine having the formula:



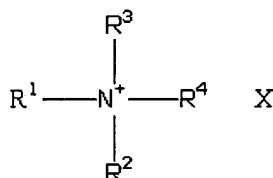
5

(22)

wherein  $R^1$  and  $R^3$  are independently hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 22 carbon atoms,  $R^2$  is hydrocarbylene or substituted hydrocarbylene having from 2 to about 18 carbon atoms, and  $R^4$  and  $R^5$  are independently hydroxyalkyl, polyhydroxyalkyl, or poly(hydroxyalkyl)alkyl;

10

(h) quaternary poly(hydroxyalkyl)amine salts having the formula:

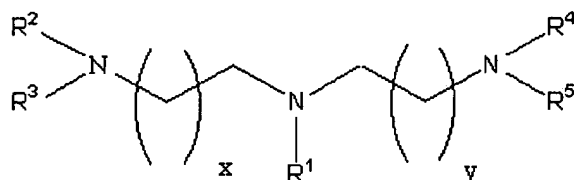


(24)

wherein  $R^1$  is hydrocarbyl or substituted hydrocarbyl having from about 4 to about 30 carbon atoms or  $-X_m-(R^4O)_yR^5$ ,  $R^2$  and  $R^3$  are independently hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms,  $R^4$  is hydroxyalkyl, polyhydroxyalkyl, or poly(hydroxyalkyl)alkyl,  $X^-$  is an agriculturally acceptable anion;  $R^4$  in each of the  $y(R^4O)$  groups is independently  $C_2-C_4$  alkylene;  $R^5$  is hydrogen or a linear or branched alkyl group having 1 to about 4 carbon atoms;  $X$  is hydrocarbylene or substituted hydrocarbylene having from 2 to about 18 carbon atoms;  $m$  is 0 or 1; and  $y$  is an average number from 0 to about 30;

20

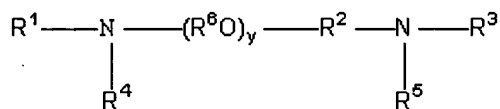
(i) triamines having the formula:



(27)

wherein  $R^1$  is hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms;  $R^2$ ,  $R^3$ ,  $R^4$  and  $R^5$  are independently hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, or  $-(R^6)_s(R^7O)_nR^6$ ;  $R^6$  is hydrogen or a linear or branched alkyl group having from 1 to about 4 carbon atoms,  $R^7$  in each of the  $n$   $(R^7O)$  groups is independently  $C_2$ - $C_4$  alkylene;  $R^8$  is hydrocarbylene or substituted hydrocarbylene having from 1 to about 6 carbon atoms,  $n$  is an average number from 1 to about 10,  $s$  is 0 or 1, and  $x$  and  $y$  are independently an integer from 1 to about 4;

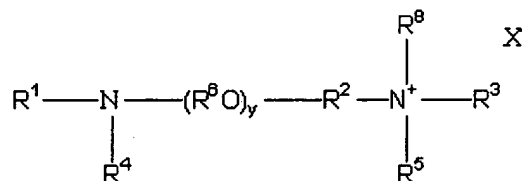
(j) diamines having the formula:



(28)

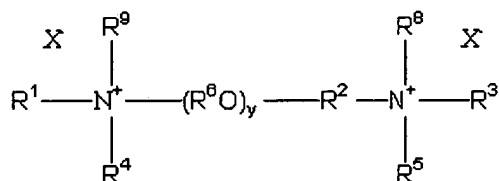
wherein  $R^1$ ,  $R^3$ ,  $R^4$  and  $R^5$  are independently hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, or  $-(R^6O)_xR^7$ ,  $R^2$  is hydrocarbylene or substituted hydrocarbylene having from 2 to about 30 carbon atoms,  $C(=NR^{11})NR^{12}R^{13}$ -,  $-C(=O)NR^{12}R^{13}$ -,  $-C(=S)NR^{12}R^{13}$ -,  $-C(=NR^{12})$ -,  $-C(S)$ -, or  $-C(O)$ -,  $R^6$  in each of the  $x$   $(R^6O)$  and  $y$   $(R^6O)$  groups is independently  $C_2$ - $C_4$  alkylene,  $R^7$  is hydrogen, or a linear or branched alkyl group having from 1 to about 30 carbon atoms,  $R^{11}$ ,  $R^{12}$  and  $R^{13}$  are hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms,  $x$  is an average number from 1 to about 50, and  $y$  is an average number from 0 to about 60;

(k) mono- or di-quaternary ammonium salts having the formula:



(30)

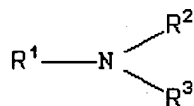
or



(29)

wherein R<sup>1</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, R<sup>8</sup> and R<sup>9</sup> are independently hydrogen, polyhydroxyalkyl, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, or - (R<sup>6</sup>O)<sub>x</sub>R<sup>7</sup>, R<sup>2</sup> is hydrocarbylene or substituted hydrocarbylene having from 2 to about 30 carbon atoms, R<sup>6</sup> in each of the x (R<sup>6</sup>O) and y (R<sup>6</sup>O) groups is independently C<sub>2</sub>-C<sub>4</sub> alkylene, R<sup>7</sup> is hydrogen, or a linear or branched alkyl group having from 1 to about 4 carbon atoms, x is an average number from 1 to about 30, y is an average number from about 3 to about 60, and X<sup>-</sup> is an agriculturally acceptable anion;

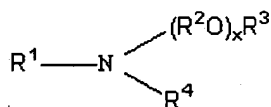
(l) a secondary or tertiary amine having the formula:



(31)

wherein R<sup>1</sup> and R<sup>2</sup> are hydrocarbyl having from 1 to about 30 carbon atoms, and R<sup>3</sup> is hydrogen or hydrocarbyl having from 1 to about 30 carbon atoms;

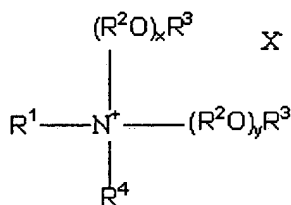
(m) monoalkylated amines having the formula:



(32)

wherein  $\text{R}^1$  and  $\text{R}^4$  are independently hydrocarbyl or substituted hydrocarbyl groups having from 1 to about 30 carbon atoms or  $-\text{R}^5\text{SR}^6$ ,  $\text{R}^2$  in each of the  $x$   $(\text{R}^2\text{O})$  groups is independently  $\text{C}_2\text{-C}_4$  alkylene,  $\text{R}^3$  is hydrogen, or a linear or branched alkyl group having from 1 to about 4 carbon atoms,  $\text{R}^5$  is a linear or branched alkyl group having from about 6 to about 30 carbon atoms,  $\text{R}^6$  is a hydrocarbyl or substituted hydrocarbyl group having from 4 to about 15 carbon atoms and  $x$  is an average number from 1 to about 60;

(n) dialkoxylated quaternary ammonium salts having the formula:

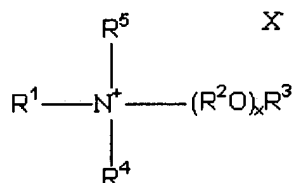


(33)

wherein  $\text{R}^1$  is hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms,  $\text{R}^2$  in each of the  $x$   $(\text{R}^2\text{O})$  and  $y$   $(\text{R}^2\text{O})$  groups is independently  $\text{C}_2\text{-C}_4$  alkylene,  $\text{R}^3$  is hydrogen, or a linear or branched alkyl group having from 1 to about 4 carbon atoms,  $\text{R}^4$  is hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms,  $x$  and  $y$  are independently an average number from 1 to about 40, and  $\text{X}^-$  is an agriculturally acceptable anion;

(o) monoalkoxylated quaternary ammonium salts having the formula:

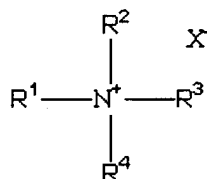




(34)

wherein R<sup>1</sup> and R<sup>5</sup> are independently hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, R<sup>4</sup> is hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, R<sup>2</sup> in each of the x (R<sup>2</sup>O) groups is independently C<sub>2</sub>-C<sub>4</sub> alkylene, R<sup>3</sup> is hydrogen, or a linear or branched alkyl group having from 1 to about 30 carbon atoms, x is an average number from 1 to about 60, and X- is an agriculturally acceptable anion;

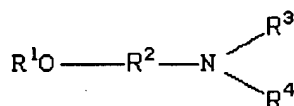
(p) quaternary ammonium salts having the formula:



(35)

wherein R<sup>1</sup>, R<sup>3</sup> and R<sup>4</sup> are independently hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, R<sup>2</sup> is hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, and X- is an agriculturally acceptable anion;

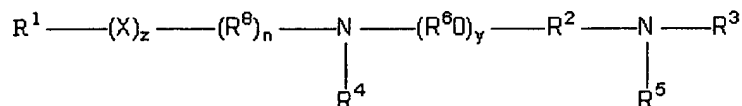
(q) etheramines having the formula:



(36)

wherein  $R^1$  is hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms;  $R^2$  is hydrocarbylene or substituted hydrocarbylene having from 2 to about 30 carbon atoms;  $R^3$  and  $R^4$  are independently hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, or  $-(R^5O)_xR^6$ ,  $R^5$  in each of the  $x(R^5O)$  groups is independently  $C_2$ - $C_4$  alkylene,  $R^6$  is hydrogen, or a linear or branched alkyl group having from 1 to about 4 carbon atoms, and  $x$  is an average number from 1 to about 50;

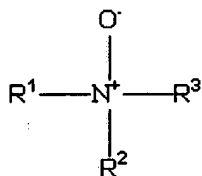
(r) diamines having the formula:



(37)

wherein  $R^1$ ,  $R^3$ ,  $R^4$  and  $R^5$  are independently hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, or  $-(R^6O)_xR^7$ ;  $R^2$  and  $R^8$  are independently hydrocarbylene or substituted hydrocarbylene having from 2 to about 30 carbon atoms,  $R^6$  in each of the  $x(R^6O)$  and  $y(R^6O)$  groups is independently  $C_2$ - $C_4$  alkylene,  $R^7$  is hydrogen, or a linear or branched alkyl group having from 1 to about 30 carbon atoms,  $x$  is an average number from 1 to about 30,  $X$  is  $-O-$ ,  $-N(R^6)-$ ,  $-C(O)-$ ,  $-C(O)O-$ ,  $-OC(O)-$ ,  $-N(R^9)C(O)-$ ,  $-C(O)N(R^9)-$ ,  $-S-$ ,  $-SO-$ , or  $-SO_2-$ ,  $y$  is 0 or an average number from 1 to about 30,  $n$  and  $z$  are independently 0 or 1, and  $R^9$  is hydrogen or hydrocarbyl or substituted hydrocarbyl;

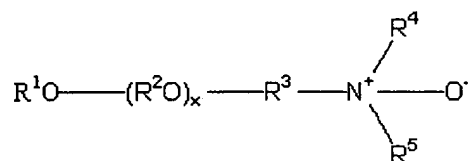
(s) amine oxides having the formula:



(38)

wherein  $R^1$ ,  $R^2$  and  $R^3$  are independently hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms,  $-(R^4O)_xR^5$ , or  $-R^6(OR^4)_xOR^5$ ;  $R^4$  in each of the  $x$  ( $R^4O$ ) groups is independently  $C_2$ - $C_4$  alkylene,  $R^5$  is hydrogen, or a hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms,  $R^6$  is a hydrocarbylene or substituted hydrocarbylene having from 1 to about 6 carbon atoms,  $x$  is an average number from 1 to about 50, and the total number of carbon atoms in  $R^1$ ,  $R^2$  and  $R^3$  is at least 8;

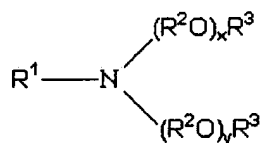
(t) alkoxyated amine oxides having the formula:



(39)

wherein  $R^1$  is hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms;  $R^2$  in each of the  $x$  ( $R^2O$ ) and  $y$  ( $R^2O$ ) groups is independently  $C_2$ - $C_4$  alkylene;  $R^3$  is a hydrocarbylene or substituted hydrocarbylene having from 2 to about 6 carbon atoms;  $R^4$  and  $R^5$  are each independently hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms,  $-(R^6)_n-(R^2O)_yR^7$ ;  $R^6$  is hydrocarbylene or substituted hydrocarbylene containing from 1 to about 6 carbon atoms,  $R^7$  is hydrogen or a linear or branched alkyl group having 1 to about 4 carbon atoms,  $n$  is 0 or 1, and  $x$  and  $y$  are independently an average number from 1 to about 60;

(u) dialkoxyated amines having the formula:

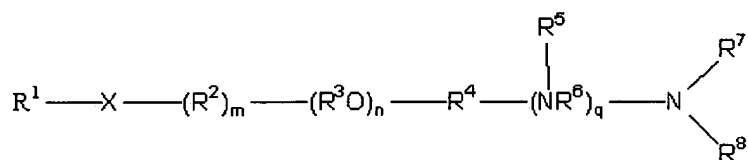


(40)

wherein  $R^1$  is hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms,  $-R^4SR^5$ , or  $-(R^2O)_zR^3$ ,  $R^2$  in each of the  $x$  ( $R^2O$ ),  $y$  ( $R^2O$ ) and

z (R<sup>2</sup>O) groups is independently C<sub>2</sub>-C<sub>4</sub> alkylene, R<sup>3</sup> is hydrogen, or a linear or branched alkyl group having from 1 to about 22 carbon atoms, R<sup>4</sup> is a linear or branched alkyl group having from about 6 to about 30 carbon atoms, R<sup>5</sup> is a linear or branched alkyl group having from about 4 to about 15 carbon atoms, and x, y and z are independently an average number from 1 to about 40, provided, however, that when R<sup>1</sup> is alkyl, either the sum of x and y is greater than 20 or R<sup>3</sup> is other than hydrogen;

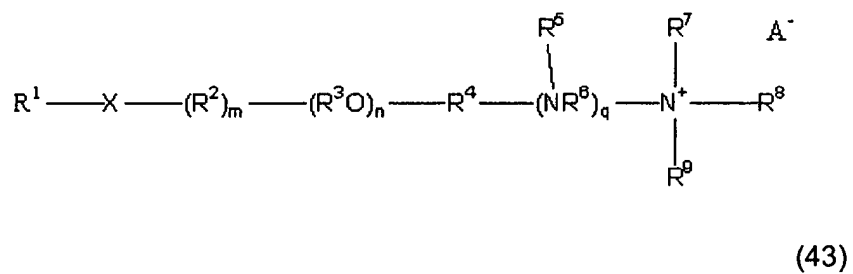
(v) aminated alkoxyated alcohols having the following chemical structure:



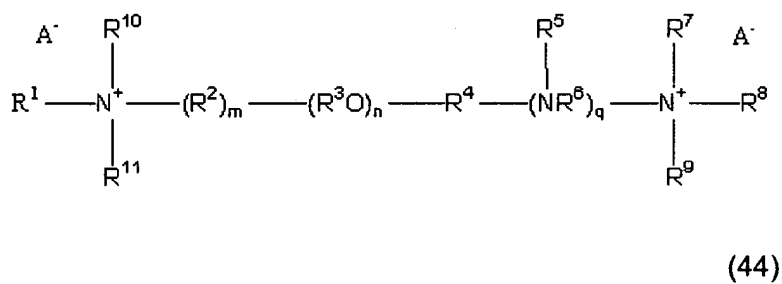
(41)

wherein R<sup>1</sup>, R<sup>7</sup>, R<sup>8</sup>, and R<sup>9</sup> are each independently hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, or -(R<sup>11</sup>)<sub>s</sub>(R<sup>3</sup>O)<sub>v</sub>R<sup>10</sup>; X is -O-, -OC(O)-, -C(O)O-, -N(R<sup>12</sup>)C(O)-, -C(O)N(R<sup>12</sup>)-, -S-, -SO-, -SO<sub>2</sub>- or -N(R<sup>9</sup>)-; R<sup>3</sup> in each of the n (R<sup>3</sup>O) groups and the v (R<sup>3</sup>O) groups is independently C<sub>2</sub>-C<sub>4</sub> alkylene; R<sup>10</sup> is hydrogen, or a linear or branched alkyl group having from 1 to about 30 carbon atoms; n is an average number from 1 to about 60; v is an average number from 1 to about 50; R<sup>2</sup> and R<sup>11</sup> are each independently hydrocarbylene or substituted hydrocarbylene having from 1 to about 6 carbon atoms; R<sup>4</sup> is hydrocarbylene or substituted hydrocarbylene having from 2 to about 6 carbon atoms; R<sup>12</sup> is hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms; m and s are each independently 0 or 1; R<sup>6</sup> is hydrocarbylene or substituted hydrocarbylene having from 2 to about 30 carbon atoms, -C(=NR<sup>12</sup>)-, -C(S)-, or -C(O)-; q is an integer from 0 to 5; and R<sup>5</sup> is hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms;

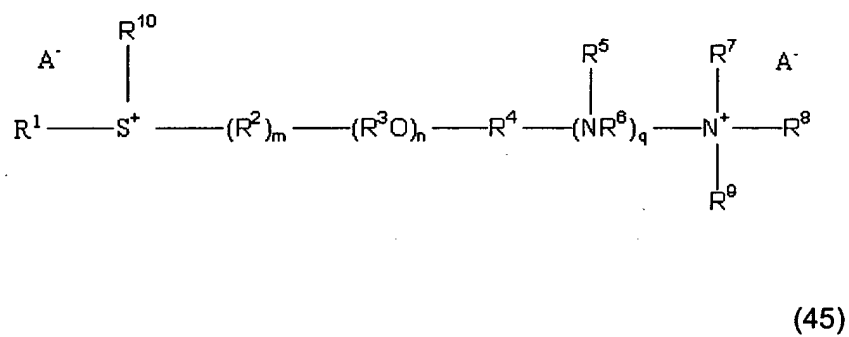
(w) a quaternary ammonium, sulfonium or sulfoxonium salt having the following chemical structure:



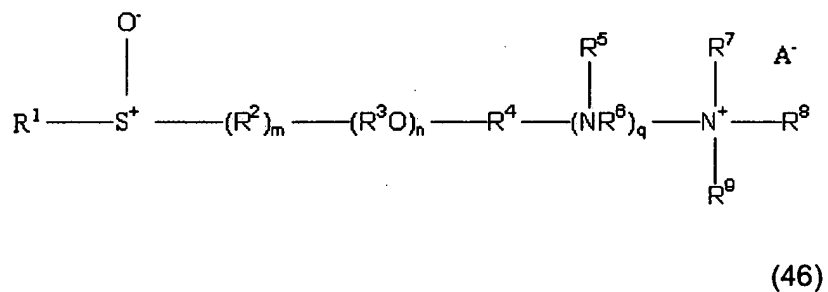
or



5 or

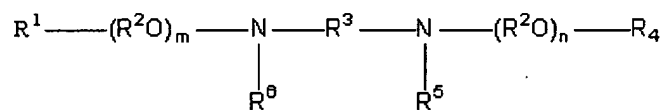


10 or



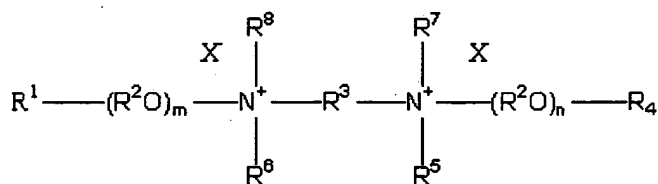
wherein  $R^1$ ,  $R^7$ ,  $R^8$ ,  $R^9$ ,  $R^{10}$  and  $R^{11}$  are independently hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, or  $-(R^{13})_s(R^3O)_vR^{12}$ ; X is  $-O-$ ,  $-OC(O)-$ ,  $-N(R^{14})C(O)-$ ,  $-C(O)N(R^{14})-$ ,  $-C(O)O-$ , or  $-S-$ ;  $R^3$  in each of the n  $(R^3O)$  groups and v  $(R^3O)$  groups is independently  $C_2-C_4$  alkylene;  $R^{12}$  is hydrogen, or a linear or branched alkyl group having from 1 to about 30 carbon atoms; n is an average number from 1 to about 60; v is an average number from 1 to about 50;  $R^2$  and  $R^{13}$  are each independently hydrocarbylene or substituted hydrocarbylene having from 1 to about 6 carbon atoms; m and s are each independently 0 or 1;  $R^4$  is hydrocarbylene or substituted hydrocarbylene having from 2 to about 6 carbon atoms;  $R^6$  is hydrocarbylene or substituted hydrocarbylene having from 2 to about 30 carbon atoms,  $-C(=NR^{12})-$ ,  $-C(S)-$ , or  $-C(O)-$ ;  $R^{14}$  is hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, q is an integer from 0 to 5;  $R^5$  is hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms; and each  $A^-$  is an agriculturally acceptable anion;

(x) a diamine or diammonium salt having the formula:



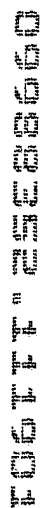
(47)

20 or



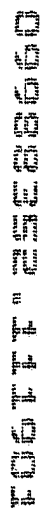
(48)

0998352-11001

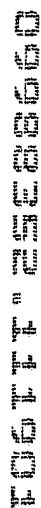
[illegible][illegible]

**THE** **NEW** **YORK** **PUBLIC** **LIBRARY**

**THE** **NEW** **YORK** **PUBLIC** **LIBRARY**

[illegible]

**THE** **NEW** **YORK** **PUBLIC** **LIBRARY**

[illegible][illegible]


$$\text{R}^1-\text{X}-(\text{R}^2\text{O})_m-(\text{R}^{10})_t-\text{X}-\text{C}(\text{R}^6)(\text{R}^7)-\text{C}(\text{R}^5)(\text{R}^4)-\text{O}-(\text{R}^2\text{O})_n\text{R}^3$$

(55)

$$R^1 - \overset{A^-}{\underset{\text{R}^9}{|}} N^+ - (R^2O)_m - (R^{10})_t - X - \begin{array}{c} R^8 \\ | \\ \text{---C---} \\ | \\ R^7 \end{array} \begin{array}{c} R^5 \\ | \\ \text{---C---} \\ | \\ O - (R^2O)_n R^3 \end{array} R^4$$

(57)

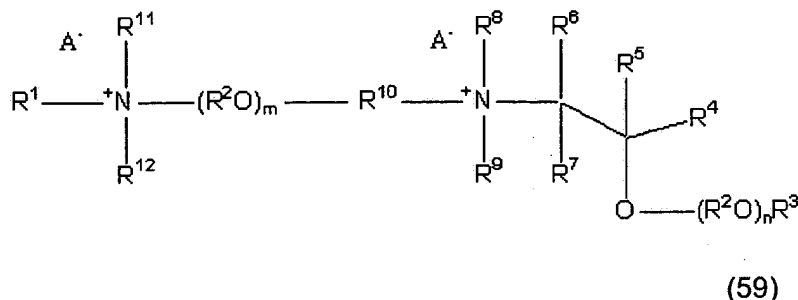
$$R^1-X-(R^2O)_m-R^{10}-N^+(R^8)(R^9)-C(R^6)(R^7)-C(R^5)(R^4)-O-(R^2O)_nR^3$$

(58)

[illegible]



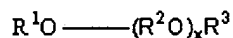
or



wherein  $\text{R}^1$ ,  $\text{R}^9$ , and  $\text{R}^{12}$  are independently hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, or  $-(\text{R}^2\text{O})_p\text{R}^{13}$ ;  $\text{R}^2$  in each of the  $m$   $(\text{R}^2\text{O})$ ,  $n$   $(\text{R}^2\text{O})$ ,  $p$   $(\text{R}^2\text{O})$  and  $q$   $(\text{R}^2\text{O})$  groups is independently  $\text{C}_2$ - $\text{C}_4$  alkylene;  $\text{R}^3$ ,  $\text{R}^8$ ,  $\text{R}^{11}$ ,  $\text{R}^{13}$  and  $\text{R}^{15}$  are independently hydrogen, or a hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms;  $\text{R}^4$  is  $-(\text{CH}_2)_y\text{OR}^{13}$  or  $-(\text{CH}_2)_y\text{O}(\text{R}^2\text{O})_q\text{R}^3$ ;  $\text{R}^5$ ,  $\text{R}^6$  and  $\text{R}^7$  are independently hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, or  $\text{R}^4$ ;  $\text{R}^{10}$  is hydrocarbylene or substituted hydrocarbylene having from 2 to about 30 carbon atoms;  $\text{R}^{14}$  is hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, or  $-(\text{CH}_2)_z\text{O}(\text{R}^2\text{O})_p\text{R}^3$ ;  $m$ ,  $n$ ,  $p$  and  $q$  are independently an average number from 1 to about 50;  $\text{X}$  is independently  $-\text{O}-$ ,  $-\text{N}(\text{R}^{14})-$ ,  $-\text{C}(\text{O})-$ ,  $-\text{C}(\text{O})\text{O}-$ ,  $-\text{OC}(\text{O})-$ ,  $-\text{N}(\text{R}^{15})\text{C}(\text{O})-$ ,  $-\text{C}(\text{O})\text{N}(\text{R}^{15})-$ ,  $-\text{S}-$ ,  $-\text{SO}-$ , or  $-\text{SO}_2-$ ;  $t$  is 0 or 1;  $\text{A}^-$  is an agriculturally acceptable anion; and  $y$  and  $z$  are independently an integer from 0 to about 30.

80. The composition of claim 65 wherein said surfactant component further comprises at least one nonionic surfactant comprising

(a) an alkoxyated alcohol having the formula:

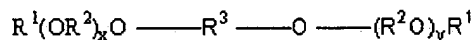


(49)

wherein  $\text{R}^1$  is hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms,  $\text{R}^2$  in each of the  $x$   $(\text{R}^2\text{O})$  groups is independently  $\text{C}_2$ - $\text{C}_4$  alkylene,  $\text{R}^3$

is hydrogen, or a linear or branched alkyl group having from 1 to about 4 carbon atoms, and x is an average number from 1 to about 60;

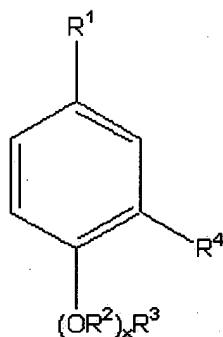
(b) dialkoxylated alcohols having the formula:



(50)

5 wherein  $R^1$  is independently hydrogen, or a linear or branched alkyl group having from 1 to about 4 carbon atoms,  $R^2$  in each of the x ( $R^2O$ ) and the y ( $R^2O$ ) groups is independently  $C_2-C_4$  alkylene,  $R^3$  is hydrocarbylene or substituted hydrocarbylene having from 2 to about 30 carbon atoms, and x and y are independently an average number from 1 to about 60; or

10 (c) alkoxyated dialkylphenols having the formula:



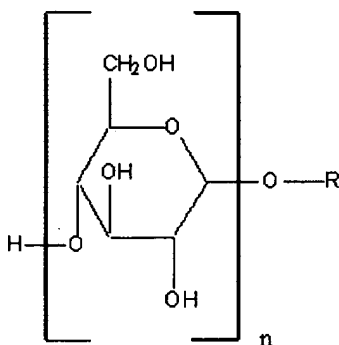
(51)

15

wherein  $R^1$  and  $R^4$  are independently hydrogen, or a linear or branched alkyl group having from 1 to about 30 carbon atoms and at least one of  $R^1$  and  $R^4$  is an alkyl group,  $R^2$  in each of the x ( $R^2O$ ) groups is independently  $C_2-C_4$  alkylene,  $R^3$  is

hydrogen, or a linear or branched alkyl group having from 1 to about 4 carbon atoms, and x is an average number from 1 to about 60; or

(d) a glycoside having the formula:



(61)

wherein n is the degree of polymerization, or number of glucose groups, and R is a branched or straight chain alkyl group preferably having from 4 to 18 carbon atoms, or a mixture of alkyl groups having an average value within the given range.

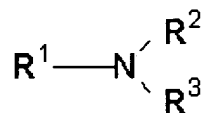
81. An aqueous herbicidal concentrate composition comprising:

(i) a water-soluble herbicide dissolved in an aqueous medium, the water-soluble herbicide being present in a concentration that is biologically effective when the composition is diluted in a suitable volume of water and applied to the foliage of a susceptible plant;

(ii) a surfactant component comprising: at least one cationic surfactant; and one or more amine or quaternary ammonium salt compounds, each of which comprises an alkyl or aryl substituent having from about 4 to about 16 carbon atoms and not more than ten ethylene oxide linkages within the compound, said compounds being present in an amount which enhances the compatibility of said surfactant component with the herbicide; said surfactant component being present in a concentration sufficient to provide acceptable temperature stability of the composition such that the composition has a cloud point of at least about 50°C and a crystallization point not greater than about 0°C.

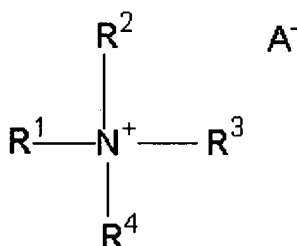
82. The composition of claim 81 wherein the cloud point is at least about 60°C.

83. The composition of claim 81 wherein said compounds are selected from the group consisting of amines or quaternary ammonium salts having the formula:



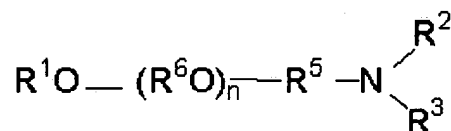
(5)

or



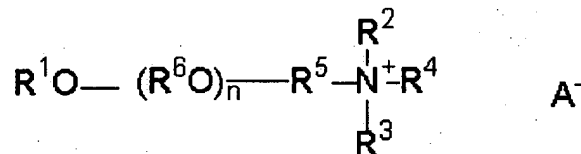
(6)

or



(7)

or



(8)

wherein R<sup>1</sup> is linear or branched alkyl or aryl having from about 4 to about 16 carbon atoms, R<sup>2</sup> is hydrogen, methyl, ethyl, or -(CH<sub>2</sub>CH<sub>2</sub>O)<sub>x</sub>H, R<sup>3</sup> is hydrogen, methyl, ethyl, or -(CH<sub>2</sub>CH<sub>2</sub>O)<sub>y</sub>H wherein the sum of X and y is not more than about 5; R<sup>4</sup> is hydrogen or methyl; R<sup>6</sup> in each of the n (R<sup>6</sup>O) groups is independently C<sub>2</sub>-C<sub>4</sub> alkylene; R<sup>5</sup> is hydrocarbylene or substituted hydrocarbylene having from 2 to about 6 carbon atoms; and A- is an agriculturally acceptable anion.

84. The composition of claim 81 wherein the herbicide is glyphosate or a salt or ester thereof.

85. The composition of claim 84 wherein the glyphosate is predominantly in the form of the potassium, monoammonium, diammonium, sodium, monoethanolamine, n-propylamine, ethylamine, ethylenediamine, hexamethylenediamine or trimethylsulfonium salt thereof.

86. The composition of claim 85 wherein the glyphosate is predominantly in the form of the potassium, monoammonium, diammonium, sodium, monoethanolamine, n-propylamine, ethylamine, ethylenediamine, or hexamethylenediamine salt thereof.

87. The composition of claim 81 wherein the surfactant component is in a stable emulsion.

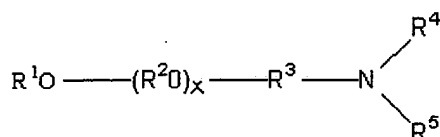
88. The composition of claim 81 wherein the surfactant component is in a stable suspension.

89. The composition of claim 81 wherein the surfactant component is in a stable dispersion.

90. The composition of claim 81 wherein the surfactant component is in a solution.

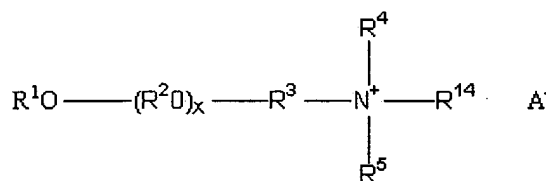
91. The composition of claim 81 wherein the composition is stable after storage at 50°C for at least 14 days.

92. The composition of claim 81 wherein the composition is stable after storage at 50°C for about 28 days.
93. The composition of claim 81 wherein the composition has a viscosity of less than about 1000 centipoise at 0°C at 45/s shear rate.
94. The composition of claim 81 wherein said surfactant component is selected such that the composition exhibits no crystallization of said herbicide when stored at a temperature of about 0°C for a period of about 7 days.
95. The composition of claim 81 wherein said glyphosate, predominantly in the form of the potassium salt thereof, is in solution in said medium in an amount of about 310 to about 600 grams of acid equivalent per liter of the composition.
96. The composition of claim 95 wherein said glyphosate, predominantly in the form of the potassium salt thereof, is in solution in said medium in an amount of about 360 to about 600 grams of acid equivalent per liter of the composition.
97. The composition of claim 84 wherein said glyphosate is in solution in said medium in an amount greater than 450 grams of acid equivalent per liter of the composition.
98. The composition of claim 81 wherein the total amount of surfactant is from about 20 to about 300 grams per liter of the composition.
99. The composition of claim 81 wherein the composition is substantially homogeneous upon storage at 50°C for one week.
100. The composition of claim 81 wherein said cationic surfactant comprises  
(a) aminated alkoxyated alcohol having the formula:



(9)

or

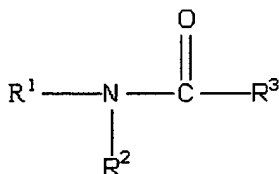


(10)

wherein R<sup>1</sup> is hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms; R<sup>2</sup> in each of the x (R<sup>2</sup>O) and y (R<sup>2</sup>O) groups is independently C<sub>2</sub>-C<sub>4</sub> alkylene; R<sup>3</sup> and R<sup>6</sup> are each independently hydrocarbylene or substituted hydrocarbylene having from 1 to about 6 carbon atoms; R<sup>4</sup> is hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, hydroxy substituted hydrocarbyl, -(R<sup>6</sup>)<sub>n</sub>-(R<sup>2</sup>O)<sub>y</sub>R<sup>7</sup>, -C(=NR<sup>11</sup>)NR<sup>12</sup>R<sup>13</sup>, -C(=O)NR<sup>12</sup>R<sup>13</sup>, -C(=S)NR<sup>12</sup>R<sup>13</sup> or together with R<sup>5</sup> and the nitrogen atom to which they are attached, form a cyclic or heterocyclic ring; R<sup>5</sup> is hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, hydroxy substituted hydrocarbyl, -(R<sup>6</sup>)<sub>n</sub>-(R<sup>2</sup>O)<sub>y</sub>R<sup>7</sup>, -C(=NR<sup>11</sup>)NR<sup>12</sup>R<sup>13</sup>, -C(=O)NR<sup>12</sup>R<sup>13</sup>, -C(=S)NR<sup>12</sup>R<sup>13</sup>, or together with R<sup>4</sup> and the nitrogen atom to which they are attached, form a cyclic or heterocyclic ring; R<sup>7</sup> is hydrogen or a linear or branched alkyl group having 1 to about 4 carbon atoms; R<sup>11</sup>, R<sup>12</sup> and R<sup>13</sup> are hydrogen, hydrocarbyl or substituted hydrocarbyl, R<sup>14</sup> is hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, hydroxy substituted hydrocarbyl, -(R<sup>6</sup>)<sub>n</sub>-(R<sup>2</sup>O)<sub>y</sub>R<sup>7</sup>, -C(=NR<sup>11</sup>)NR<sup>12</sup>R<sup>13</sup>, -C(=O)NR<sup>12</sup>R<sup>13</sup>, or -C(=S)NR<sup>12</sup>R<sup>13</sup>, n is 0 or 1, x and y are

independently an average number from 1 to about 60, and A- is an agriculturally acceptable anion;

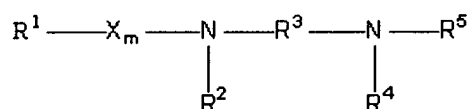
(b) hydroxylated amides having the formula:



(11)

wherein R<sup>1</sup> is hydrocarbyl or substituted hydrocarbyl having from about 4 to about 30 carbon atoms, R<sup>2</sup> is hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, and R<sup>3</sup> is hydroxyalkyl, polyhydroxyalkyl, or poly(hydroxyalkyl)alkyl;

(c) diamines having the formula:

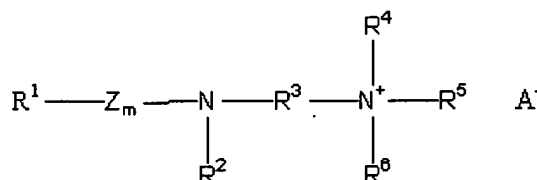


(13)

wherein R<sup>1</sup>, R<sup>2</sup> and R<sup>5</sup> are independently hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms or -R<sup>8</sup>(OR<sup>9</sup>)<sub>n</sub>OR<sup>10</sup>, R<sup>3</sup> is hydrocarbylene or substituted hydrocarbylene having from 2 to about 18 carbon atoms, R<sup>8</sup> and R<sup>9</sup> are individually hydrocarbylene or substituted hydrocarbylene having from 2 to about 4 carbon atoms, R<sup>4</sup> and R<sup>10</sup> are independently hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, m is 0 or 1, n is an average number from 0 to about 40, and X is -C(O)- or -SO<sub>2</sub>-;

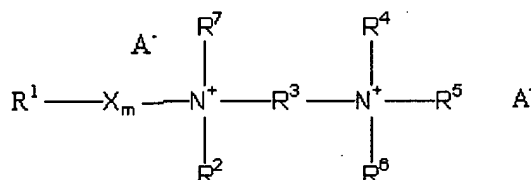
(d) mono- or di-ammonium salts having the formula:





(14)

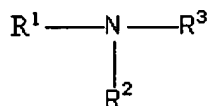
5 or



(15)

wherein R<sup>1</sup>, R<sup>2</sup>, R<sup>4</sup>, R<sup>5</sup> and R<sup>7</sup> are independently hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms or -R<sup>8</sup>(OR<sup>9</sup>)<sub>n</sub>OR<sup>10</sup>, R<sup>6</sup> is hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, R<sup>3</sup> is hydrocarbylene or substituted hydrocarbylene having from 2 to about 30 carbon atoms, R<sup>8</sup> and R<sup>9</sup> are individually hydrocarbylene or substituted hydrocarbylene having from 2 to about 4 carbon atoms, R<sup>10</sup> is hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, m is 0 or 1, n is an average number from 0 to about 40, X is -C(O)- or -SO<sub>2</sub>-, Z is -C(O)-, and A<sup>-</sup> is an agriculturally acceptable anion;

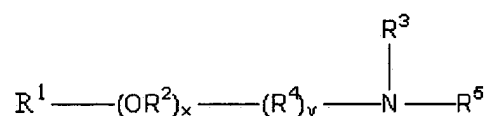
(e) poly(hydroxyalkyl)amines having the formula:



(16)

wherein R<sup>1</sup> is hydrocarbyl or substituted hydrocarbyl having from about 4 to about 30 carbon atoms or -R<sup>4</sup>OR<sup>5</sup>, R<sup>2</sup> is hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, R<sup>3</sup> is hydroxyalkyl, polyhydroxyalkyl, or poly(hydroxyalkyl)alkyl, R<sup>4</sup> is hydrocarbylene or substituted hydrocarbylene having from 2 to about 18 carbon atoms, and R<sup>5</sup> is hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms;

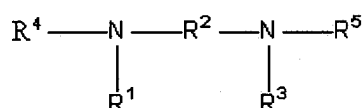
(f) alkoxyated poly(hydroxyalkyl)amines having the formula:



(19)

wherein R<sup>1</sup> and R<sup>3</sup> are independently hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, R<sup>2</sup> in each of the x (R<sup>2</sup>O) groups is independently C<sub>2</sub>-C<sub>4</sub> alkylene; R<sup>4</sup> is hydrocarbylene or substituted hydrocarbylene having from 1 to about 30 carbon atoms, R<sup>5</sup> is hydroxyalkyl, polyhydroxyalkyl, or poly(hydroxyalkyl)alkyl; x is an average number from 0 to about 30, and y is 0 or 1;

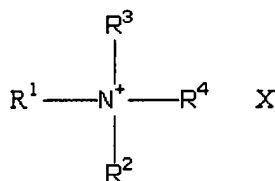
(g) di-poly(hydroxyalkyl)amine having the formula:



(22)

wherein R<sup>1</sup> and R<sup>3</sup> are independently hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 22 carbon atoms, R<sup>2</sup> is hydrocarbylene or substituted hydrocarbylene having from 2 to about 18 carbon atoms, and R<sup>4</sup> and R<sup>5</sup> are independently hydroxyalkyl, polyhydroxyalkyl, or poly(hydroxyalkyl)alkyl;

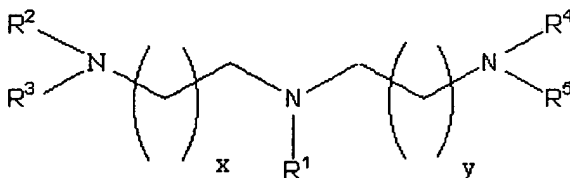
(h) quaternary poly(hydroxyalkyl)amine salts having the formula:



(24)

wherein R<sup>1</sup> is hydrocarbonyl or substituted hydrocarbonyl having from about 4 to about 30 carbon atoms or -X<sub>m</sub>-(R<sup>4</sup>O)<sub>y</sub>R<sup>5</sup>, R<sup>2</sup> and R<sup>3</sup> are independently hydrogen or hydrocarbonyl or substituted hydrocarbonyl having from 1 to about 30 carbon atoms, R<sup>4</sup> is hydroxyalkyl, polyhydroxyalkyl, or poly(hydroxyalkyl)alkyl, X- is an agriculturally acceptable anion; R<sup>4</sup> in each of the y(R<sup>4</sup>O) groups is independently C<sub>2</sub>-C<sub>4</sub> alkylene; R<sup>5</sup> is hydrogen or a linear or branched alkyl group having 1 to about 4 carbon atoms; X is hydrocarbonylene or substituted hydrocarbonylene having from 2 to about 18 carbon atoms; m is 0 or 1; and y is an average number from 0 to about 30;

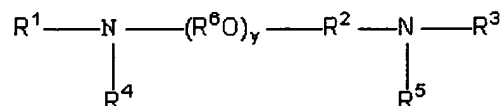
(i) triamines having the formula:



(27)

wherein R<sup>1</sup> is hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms; R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup> and R<sup>5</sup> are independently hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, or -(R<sup>8</sup>)<sub>s</sub>(R<sup>7</sup>O)<sub>n</sub>R<sup>6</sup>; R<sup>6</sup> is hydrogen or a linear or branched alkyl group having from 1 to about 4 carbon atoms, R<sup>7</sup> in each of the n (R<sup>7</sup>O) groups is independently C<sub>2</sub>-C<sub>4</sub> alkylene; R<sup>8</sup> is hydrocarbylene or substituted hydrocarbylene having from 1 to about 6 carbon atoms, n is an average number from 1 to about 10, s is 0 or 1, and x and y are independently an integer from 1 to about 4;

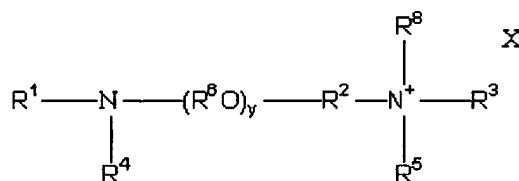
(j) diamines having the formula:



(28)

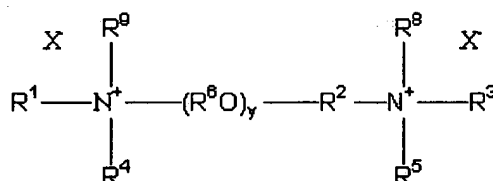
wherein  $\text{R}^1$ ,  $\text{R}^3$ ,  $\text{R}^4$  and  $\text{R}^5$  are independently hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, or  $-(\text{R}^6\text{O})_x\text{R}^7$ ,  $\text{R}^2$  is hydrocarbylene or substituted hydrocarbylene having from 2 to about 30 carbon atoms,  $\text{C}(=\text{NR}^{11})\text{NR}^{12}\text{R}^{13}$ -,  $-\text{C}(=\text{O})\text{NR}^{12}\text{R}^{13}$ -,  $-\text{C}(=\text{S})\text{NR}^{12}\text{R}^{13}$ -,  $-\text{C}(=\text{NR}^{12})$ -,  $-\text{C}(\text{S})$ -, or  $-\text{C}(\text{O})$ -,  $\text{R}^6$  in each of the  $x$   $(\text{R}^6\text{O})$  and  $y$   $(\text{R}^6\text{O})$  groups is independently  $\text{C}_2$ - $\text{C}_4$  alkylene,  $\text{R}^7$  is hydrogen, or a linear or branched alkyl group having from 1 to about 30 carbon atoms,  $\text{R}^{11}$ ,  $\text{R}^{12}$  and  $\text{R}^{13}$  are hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms,  $x$  is an average number from 1 to about 50, and  $y$  is an average number from 0 to about 60;

(k) mono- or di-quaternary ammonium salts having the formula:



(30)

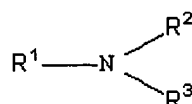
or



(29)

wherein  $R^1$ ,  $R^3$ ,  $R^4$ ,  $R^5$ ,  $R^8$  and  $R^9$  are independently hydrogen, polyhydroxyalkyl, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, or - $(R^6O)_xR^7$ ,  $R^2$  is hydrocarbylene or substituted hydrocarbylene having from 2 to about 30 carbon atoms,  $R^6$  in each of the  $x$   $(R^6O)$  and  $y$   $(R^6O)$  groups is independently  $C_2$ - $C_4$  alkylene,  $R^7$  is hydrogen, or a linear or branched alkyl group having from 1 to about 4 carbon atoms,  $x$  is an average number from 1 to about 30,  $y$  is an average number from about 3 to about 60, and  $X^-$  is an agriculturally acceptable anion;

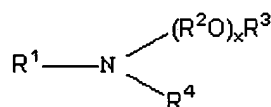
(l) a secondary or tertiary amine having the formula:



(31)

wherein  $R^1$  and  $R^2$  are hydrocarbyl having from 1 to about 30 carbon atoms, and  $R^3$  is hydrogen or hydrocarbyl having from 1 to about 30 carbon atoms;

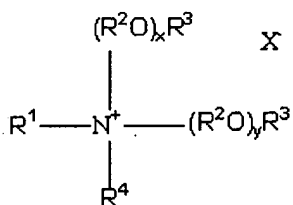
(m) monoalkylated amines having the formula:



(32)

wherein  $R^1$  and  $R^4$  are independently hydrocarbyl or substituted hydrocarbyl groups having from 1 to about 30 carbon atoms or  $-R^5SR^6$ ,  $R^2$  in each of the  $x$   $(R^2O)$  groups is independently  $C_2$ - $C_4$  alkylene,  $R^3$  is hydrogen, or a linear or branched alkyl group having from 1 to about 4 carbon atoms,  $R^5$  is a linear or branched alkyl group having from about 6 to about 30 carbon atoms,  $R^6$  is a hydrocarbyl or substituted hydrocarbyl group having from 4 to about 15 carbon atoms and  $x$  is an average number from 1 to about 60;

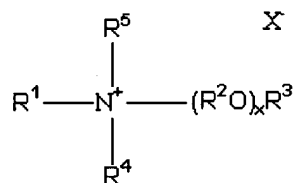
(n) dialkoxylated quaternary ammonium salts having the formula:



(33)

5 wherein R<sup>1</sup> is hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, R<sup>2</sup> in each of the x (R<sup>2</sup>O) and y (R<sup>2</sup>O) groups is independently C<sub>2</sub>-C<sub>4</sub> alkylene, R<sup>3</sup> is hydrogen, or a linear or branched alkyl group having from 1 to about 4 carbon atoms, R<sup>4</sup> is hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, x and y are independently an average number from 1 to about 40, and X<sup>-</sup> is an agriculturally acceptable anion;

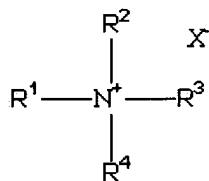
(o) monoalkoxylated quaternary ammonium salts having the formula:



(34)

10 wherein R<sup>1</sup> and R<sup>5</sup> are independently hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, R<sup>4</sup> is hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, R<sup>2</sup> in each of the x (R<sup>2</sup>O) groups is independently C<sub>2</sub>-C<sub>4</sub> alkylene, R<sup>3</sup> is hydrogen, or a linear or branched alkyl group having from 1 to about 30 carbon atoms, x is an average number from 1 to  
15 about 60, and X<sup>-</sup> is an agriculturally acceptable anion;

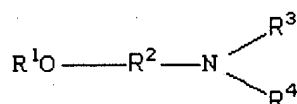
(p) quaternary ammonium salts having the formula:



(35)

wherein R<sup>1</sup>, R<sup>3</sup> and R<sup>4</sup> are independently hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, R<sup>2</sup> is hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, and X<sup>-</sup> is an agriculturally acceptable anion;

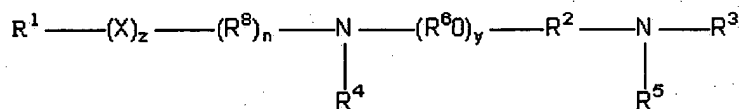
(q) etheramines having the formula:



(36)

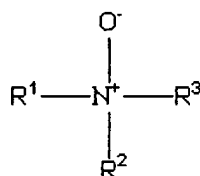
wherein R<sup>1</sup> is hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms; R<sup>2</sup> is hydrocarbylene or substituted hydrocarbylene having from 2 to about 30 carbon atoms; R<sup>3</sup> and R<sup>4</sup> are independently hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, or -(R<sup>5</sup>O)<sub>x</sub>R<sup>6</sup>, R<sup>5</sup> in each of the x(R<sup>5</sup>O) groups is independently C<sub>2</sub>-C<sub>4</sub> alkylene, R<sup>6</sup> is hydrogen, or a linear or branched alkyl group having from 1 to about 4 carbon atoms, and x is an average number from 1 to about 50;

(r) diamines having the formula:



(37)

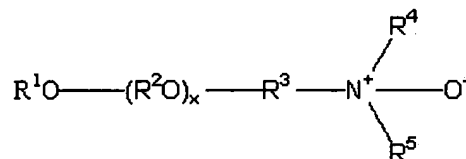
- wherein  $R^1$ ,  $R^3$ ,  $R^4$  and  $R^5$  are independently hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, or  $-(R^6O)_xR^7$ ;  $R^2$  and  $R^8$  are independently hydrocarbylene or substituted hydrocarbylene having from 2 to about 30 carbon atoms,  $R^6$  in each of the  $x$  ( $R^6O$ ) and  $y$  ( $R^6O$ ) groups is independently  $C_2$ - $C_4$  alkylene,  $R^7$  is hydrogen, or a linear or branched alkyl group having from 1 to about 30 carbon atoms,  $x$  is an average number from 1 to about 30,  $X$  is  $-O-$ ,  $-N(R^6)-$ ,  $-C(O)-$ ,  $-C(O)O-$ ,  $-OC(O)-$ ,  $-N(R^9)C(O)-$ ,  $-C(O)N(R^9)-$ ,  $-S-$ ,  $-SO-$ , or  $-SO_2-$ ,  $y$  is 0 or an average number from 1 to about 30,  $n$  and  $z$  are independently 0 or 1, and  $R^9$  is hydrogen or hydrocarbyl or substituted hydrocarbyl;
- (s) amine oxides having the formula:



(38)

- wherein  $R^1$ ,  $R^2$  and  $R^3$  are independently hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms,  $-(R^4O)_xR^5$ , or  $-R^6(OR^4)_xOR^5$ ;  $R^4$  in each of the  $x$  ( $R^4O$ ) groups is independently  $C_2$ - $C_4$  alkylene,  $R^5$  is hydrogen, or a hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms,  $R^6$  is a hydrocarbylene or substituted hydrocarbylene having from 1 to about 6 carbon atoms,  $x$  is an average number from 1 to about 50, and the total number of carbon atoms in  $R^1$ ,  $R^2$  and  $R^3$  is at least 8;

(t) alkoxylated amine oxides having the formula:

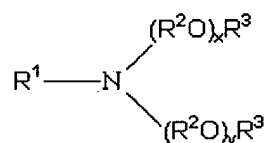


(39)



wherein R<sup>1</sup> is hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms; R<sup>2</sup> in each of the x (R<sup>2</sup>O) and y (R<sup>2</sup>O) groups is independently C<sub>2</sub>-C<sub>4</sub> alkylene; R<sup>3</sup> is a hydrocarbylene or substituted hydrocarbylene having from 2 to about 6 carbon atoms; R<sup>4</sup> and R<sup>5</sup> are each independently hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, - (R<sup>6</sup>)<sub>n</sub>-(R<sup>2</sup>O)<sub>y</sub>R<sup>7</sup>; R<sup>6</sup> is hydrocarbylene or substituted hydrocarbylene containing from 1 to about 6 carbon atoms, R<sup>7</sup> is hydrogen or a linear or branched alkyl group having 1 to about 4 carbon atoms, n is 0 or 1, and x and y are independently an average number from 1 to about 60;

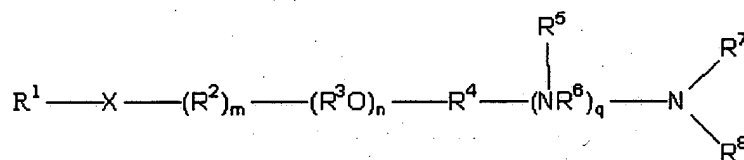
(u) dialkoxylated amines having the formula:



(40)

wherein R<sup>1</sup> is hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, -R<sup>4</sup>SR<sup>5</sup>, or -(R<sup>2</sup>O)<sub>z</sub>R<sup>3</sup>, R<sup>2</sup> in each of the x (R<sup>2</sup>O), y (R<sup>2</sup>O) and z (R<sup>2</sup>O) groups is independently C<sub>2</sub>-C<sub>4</sub> alkylene, R<sup>3</sup> is hydrogen, or a linear or branched alkyl group having from 1 to about 22 carbon atoms, R<sup>4</sup> is a linear or branched alkyl group having from about 6 to about 30 carbon atoms, R<sup>5</sup> is a linear or branched alkyl group having from about 4 to about 15 carbon atoms, and x, y and z are independently an average number from 1 to about 40, provided, however, that when R<sup>1</sup> is alkyl, either the sum of x and y is greater than 20 or R<sup>3</sup> is other than hydrogen;

(v) aminated alkoxyated alcohols having the following chemical structure:

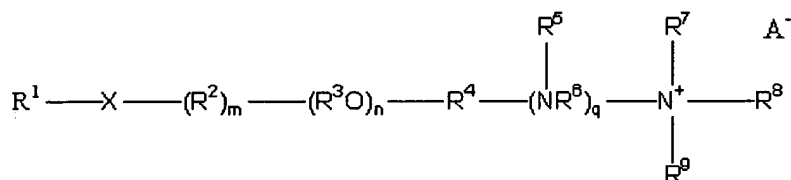


(41)

FOUO 252560

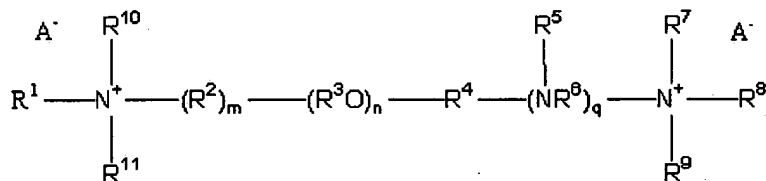
wherein  $R^1$ ,  $R^7$ ,  $R^8$ , and  $R^9$  are each independently hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, or  $-(R^{11})_s(R^3O)_vR^{10}$ ;  $X$  is  $-O-$ ,  $-OC(O)-$ ,  $-C(O)O-$ ,  $-N(R^{12})C(O)-$ ,  $-C(O)N(R^{12})-$ ,  $-S-$ ,  $-SO-$ ,  $-SO_2-$  or  $-N(R^9)-$ ;  $R^3$  in each of the  $n$   $(R^3O)$  groups and the  $v$   $(R^3O)$  groups is independently  $C_2-C_4$  alkylene;  $R^{10}$  is hydrogen, or a linear or branched alkyl group having from 1 to about 30 carbon atoms;  $n$  is an average number from 1 to about 60;  $v$  is an average number from 1 to about 50;  $R^2$  and  $R^{11}$  are each independently hydrocarbylene or substituted hydrocarbylene having from 1 to about 6 carbon atoms;  $R^4$  is hydrocarbylene or substituted hydrocarbylene having from 2 to about 6 carbon atoms;  $R^{12}$  is hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms;  $m$  and  $s$  are each independently 0 or 1;  $R^6$  is hydrocarbylene or substituted hydrocarbylene having from 2 to about 30 carbon atoms,  $-C(=NR^{12})-$ ,  $-C(S)-$ , or  $-C(O)-$ ;  $q$  is an integer from 0 to 5; and  $R^5$  is hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms;

(w) a quaternary ammonium, sulfonium or sulfoxonium salt having the following chemical structure:



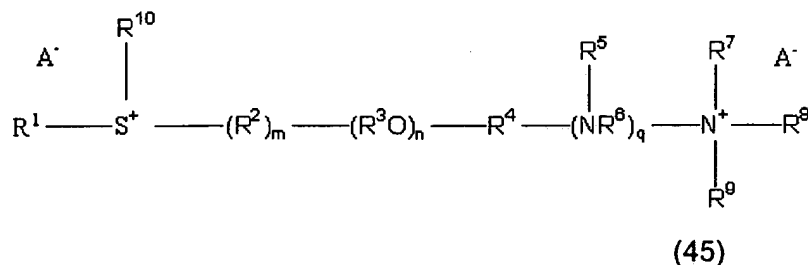
(43)

or

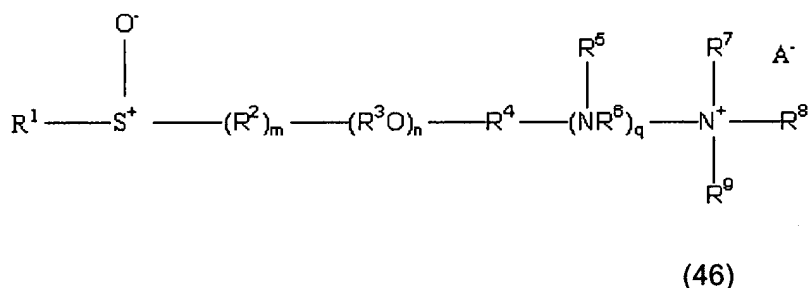


(44)

or

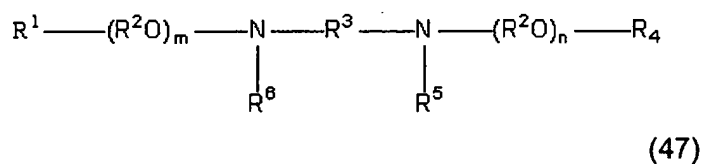


or

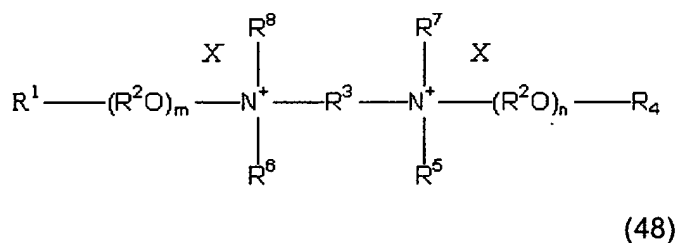


- 5 wherein  $\text{R}^1$ ,  $\text{R}^7$ ,  $\text{R}^8$ ,  $\text{R}^9$ ,  $\text{R}^{10}$  and  $\text{R}^{11}$  are independently hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, or  $-(\text{R}^{13})_s(\text{R}^3\text{O})_v\text{R}^{12}$ ; X is -O-, -OC(O)-, -N( $\text{R}^{14}$ )C(O)-, -C(O)N( $\text{R}^{14}$ )-, -C(O)O-, or -S-;  $\text{R}^3$  in each of the n ( $\text{R}^3\text{O}$ ) groups and v ( $\text{R}^3\text{O}$ ) groups is independently  $\text{C}_2$ - $\text{C}_4$  alkylene;  $\text{R}^{12}$  is hydrogen, or a linear or branched alkyl group having from 1 to about 30 carbon atoms; n is an
- 10 average number from 1 to about 60; v is an average number from 1 to about 50;  $\text{R}^2$  and  $\text{R}^{13}$  are each independently hydrocarbylene or substituted hydrocarbylene having from 1 to about 6 carbon atoms; m and s are each independently 0 or 1;  $\text{R}^4$  is hydrocarbylene or substituted hydrocarbylene having from 2 to about 6 carbon atoms;  $\text{R}^6$  is hydrocarbylene or substituted hydrocarbylene having from 2 to about
- 15 30 carbon atoms, -C(=NR<sup>12</sup>)-, -C(S)-, or -C(O)-;  $\text{R}^{14}$  is hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, q is an integer from 0 to 5;  $\text{R}^5$  is hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms; and each  $\text{A}^-$  is an agriculturally acceptable anion;

(x) a diamine or diammonium salt having the formula:

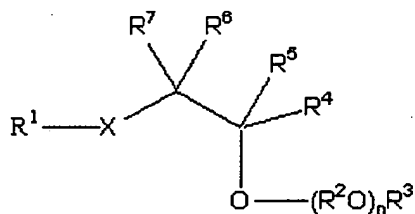


or



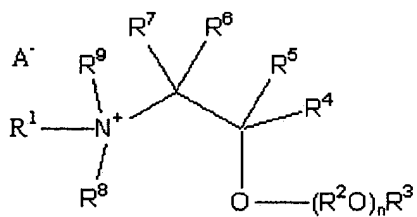
wherein R<sup>1</sup>, R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup>, R<sup>7</sup> and R<sup>8</sup> are independently hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, R<sup>2</sup> in each of the m (R<sup>2</sup>O) and n (R<sup>2</sup>O) groups and R<sup>9</sup> are independently C<sub>2</sub>-C<sub>4</sub> alkylene, R<sup>3</sup> is hydrocarbylene or substituted hydrocarbylene having from about 2 to about 6 carbon atoms or -(R<sup>2</sup>O)<sub>p</sub>R<sub>9</sub>-, m and n are individually an average number from 0 to about 50, and p is an average number from 0 to about 60; or

(y) a compound of the formula:



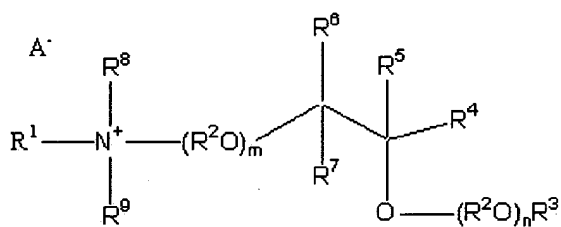
(52)

or



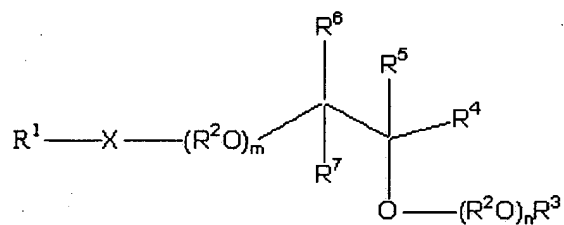
(53)

or



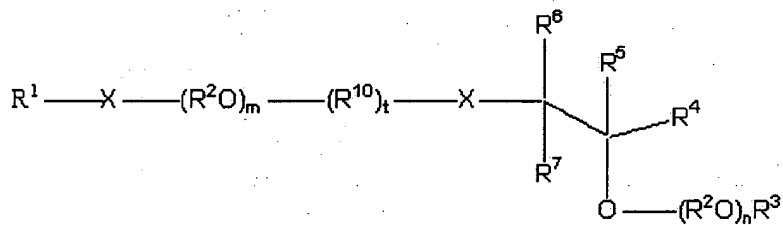
(56)

or



(54)

or

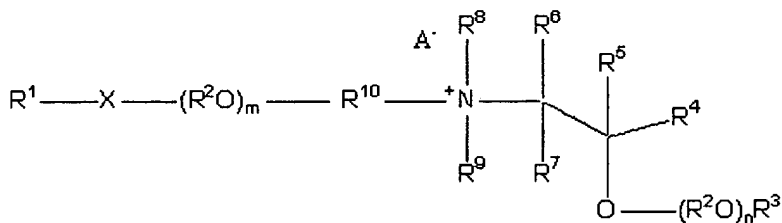


(55)

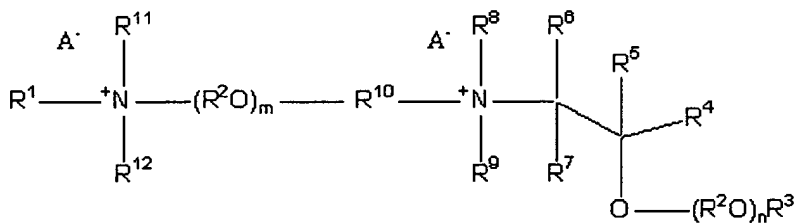
FOOTNOTES: 11904

$$R^1 - \overset{A^-}{\underset{\text{R}^9}{\overset{\text{R}^8}{N^+}}} - (R^2O)_m - (R^{10})_t - X - \begin{array}{c} R^6 \\ | \\ \text{---C---} \\ | \\ R^7 \end{array} \begin{array}{c} R^5 \\ | \\ \text{---C---} \\ | \\ O - (R^2O)_n R^3 \end{array} R^4$$

5 or



or



wherein R<sup>1</sup>, R<sup>9</sup>, and R<sup>12</sup> are independently hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, or -(R<sup>2</sup>O)<sub>p</sub>R<sup>13</sup>; R<sup>2</sup> in each of the m (R<sup>2</sup>O), n (R<sup>2</sup>O), p (R<sup>2</sup>O) and q (R<sup>2</sup>O) groups is independently C<sub>2</sub>-C<sub>4</sub> alkylene; R<sup>3</sup>, R<sup>8</sup>, R<sup>11</sup>, R<sup>13</sup> and R<sup>15</sup> are independently hydrogen, or a hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms; R<sup>4</sup> is -(CH<sub>2</sub>)<sub>y</sub>OR<sup>13</sup> or -(CH<sub>2</sub>)<sub>y</sub>O(R<sup>2</sup>O)<sub>q</sub>R<sup>3</sup>; R<sup>5</sup>, R<sup>6</sup> and R<sup>7</sup> are independently hydrogen, hydrocarbyl or substituted hydrocarbyl

having from 1 to about 30 carbon atoms, or  $R^4$ ;  $R^{10}$  is hydrocarbylene or substituted hydrocarbylene having from 2 to about 30 carbon atoms;  $R^{14}$  is hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, or - $(CH_2)_zO(R^2O)_pR^3$ ; m, n, p and q are independently an average number from 1 to about 50; X is independently -O-, -N( $R^{14}$ )-, -C(O)-, -C(O)O-, -OC(O)-, -N( $R^{15}$ )C(O)-, -C(O)N( $R^{15}$ )-, -S-, -SO-, or -SO<sub>2</sub>-; t is 0 or 1; A- is an agriculturally acceptable anion; and y and z are independently an integer from 0 to about 30.

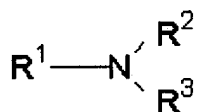
101. An aqueous herbicidal concentrate composition comprising:

- (i) a water-soluble herbicide dissolved in an aqueous medium, the water-soluble herbicide being present in a concentration that is biologically effective when the composition is diluted in a suitable volume of water and applied to the foliage of a susceptible plant;
- (ii) a surfactant component comprising at least one cationic surfactant and at least one nonionic surfactant, the surfactant component being present in a concentration sufficient to provide acceptable temperature stability of the composition such that the composition has a cloud point of at least about 50°C and a crystallization point not greater than about 0°C.

102. The composition of claim 101 wherein the cloud point is at least about 60°C.

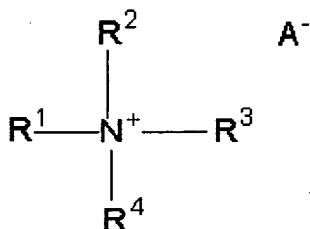
103. The composition of claim 101 wherein said surfactant component comprises one or more amine or quaternary ammonium salt compounds, each of which comprises an alkyl or aryl substituent having from about 4 to about 16 carbon atoms and not more than ten ethylene oxide linkages within the compound, said compounds being present in an amount which enhances the compatibility of said surfactant component with the herbicide.

104. The composition of claim 103 wherein said compounds are selected from the group consisting of amines or quaternary ammonium salts having the formula:



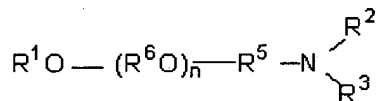
(5)

or



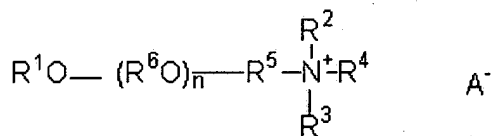
(6)

or



(7)

or



(8)

wherein R<sup>1</sup> is linear or branched alkyl or aryl having from about 4 to about 16 carbon atoms, R<sup>2</sup> is hydrogen, methyl, ethyl, or -(CH<sub>2</sub>CH<sub>2</sub>O)<sub>x</sub>H, R<sup>3</sup> is hydrogen, methyl, ethyl, or -(CH<sub>2</sub>CH<sub>2</sub>O)<sub>y</sub>H wherein the sum of X and y is not more than about 5; R<sup>4</sup> is hydrogen or methyl; R<sup>6</sup> in each of the n (R<sup>6</sup>O) groups is independently C<sub>2</sub>-C<sub>4</sub> alkylene; R<sup>5</sup> is hydrocarbylene or substituted hydrocarbylene having from 2 to about 6 carbon atoms; and A<sup>-</sup> is an agriculturally acceptable anion.



105. The composition of claim 101 wherein the herbicide is glyphosate or a salt or ester thereof.

106. The composition of claim 105 wherein the glyphosate is predominantly in the form of the potassium, monoammonium, diammonium, sodium, monoethanolamine, n-propylamine, ethylamine, ethylenediamine, hexamethylenediamine or trimethylsulfonium salt thereof.

107. The composition of claim 106 wherein the glyphosate is predominantly in the form of the potassium salt thereof.

108. The composition of claim 101 wherein the surfactant component is in a stable emulsion.

109. The composition of claim 101 wherein the surfactant component is in a stable suspension.

110. The composition of claim 101 wherein the surfactant component is in a stable dispersion.

111. The composition of claim 101 wherein the surfactant component is in a solution.

112. The composition of claim 101 wherein the composition is stable after storage at 50°C for at least 14 days.

113. The composition of claim 101 wherein the composition is stable after storage at 50°C for about 28 days.

114. The composition of claim 101 wherein the composition has a viscosity of less than about 1000 centipoise at 0°C at 45/s shear rate.

FOOTNOTES

115. The composition of claim 101 wherein said surfactant component is selected such that the composition exhibits no crystallization of said herbicide when stored at a temperature of about 0°C for a period of about 7 days.

5 116. The composition of claim 101 wherein said glyphosate, predominantly in the form of the potassium salt thereof, is in solution in said aqueous medium in an amount of about 310 to about 600 grams of acid equivalent per liter of the composition.

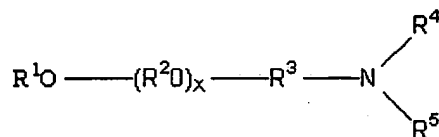
10 117. The composition of claim 116 wherein said glyphosate, predominantly in the form of the potassium salt thereof, is in solution in said aqueous medium in an amount of about 360 to about 600 grams of acid equivalent per liter of the composition.

15 118. The composition of claim 117 wherein said glyphosate, predominantly in the form of the potassium salt thereof, is in solution in said aqueous medium in an amount of about 400 to about 600 grams of acid equivalent per liter of the composition.

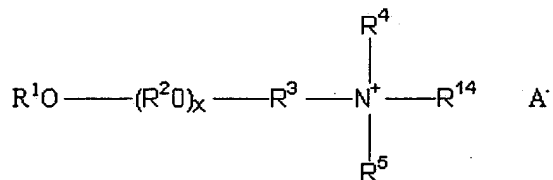
119. The composition of claim 101 wherein the total amount of surfactant is from about 20 to about 300 grams per liter of the composition.

120. The composition of claim 101 wherein the composition is substantially homogeneous upon storage at 50°C for one week.

20 121. The composition of claim 101 wherein said cationic surfactant comprises (a) aminated alkoxyated alcohol having the formula:



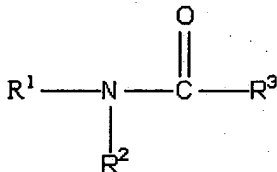
or



(10)

wherein R<sup>1</sup> is hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms; R<sup>2</sup> in each of the x (R<sup>2</sup>O) and y (R<sup>2</sup>O) groups is independently C<sub>2</sub>-C<sub>4</sub> alkylene; R<sup>3</sup> and R<sup>6</sup> are each independently hydrocarbylene or substituted hydrocarbylene having from 1 to about 6 carbon atoms; R<sup>4</sup> is hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, hydroxy substituted hydrocarbyl, -(R<sup>6</sup>)<sub>n</sub>-(R<sup>2</sup>O)<sub>y</sub>R<sup>7</sup>, -C(=NR<sup>11</sup>)NR<sup>12</sup>R<sup>13</sup>, -C(=O)NR<sup>12</sup>R<sup>13</sup>, -C(=S)NR<sup>12</sup>R<sup>13</sup> or together with R<sup>5</sup> and the nitrogen atom to which they are attached, form a cyclic or heterocyclic ring; R<sup>5</sup> is hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, hydroxy substituted hydrocarbyl, -(R<sup>6</sup>)<sub>n</sub>-(R<sup>2</sup>O)<sub>y</sub>R<sup>7</sup>, -C(=NR<sup>11</sup>)NR<sup>12</sup>R<sup>13</sup>, -C(=O)NR<sup>12</sup>R<sup>13</sup>, -C(=S)NR<sup>12</sup>R<sup>13</sup>, or together with R<sup>4</sup> and the nitrogen atom to which they are attached, form a cyclic or heterocyclic ring; R<sup>7</sup> is hydrogen or a linear or branched alkyl group having 1 to about 4 carbon atoms; R<sup>11</sup>, R<sup>12</sup> and R<sup>13</sup> are hydrogen, hydrocarbyl or substituted hydrocarbyl, R<sup>14</sup> is hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, hydroxy substituted hydrocarbyl, -(R<sup>6</sup>)<sub>n</sub>-(R<sup>2</sup>O)<sub>y</sub>R<sup>7</sup>, -C(=NR<sup>11</sup>)NR<sup>12</sup>R<sup>13</sup>, -C(=O)NR<sup>12</sup>R<sup>13</sup>, or -C(=S)NR<sup>12</sup>R<sup>13</sup>, n is 0 or 1, x and y are independently an average number from 1 to about 60, and A<sup>-</sup> is an agriculturally acceptable anion;

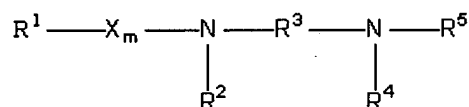
(b) hydroxylated amides having the formula:



(11)

wherein R<sup>1</sup> is hydrocarbyl or substituted hydrocarbyl having from about 4 to about 30 carbon atoms, R<sup>2</sup> is hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, and R<sup>3</sup> is hydroxyalkyl, polyhydroxyalkyl, or poly(hydroxyalkyl)alkyl;

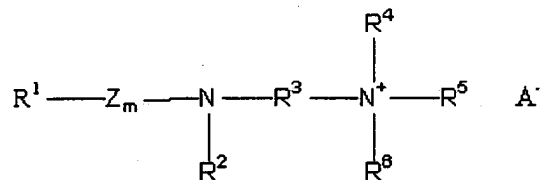
5 (c) diamines having the formula:



(13)

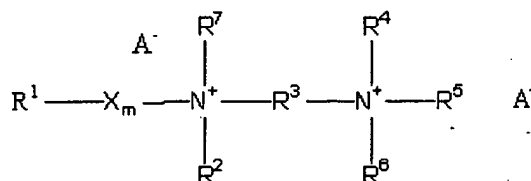
wherein R<sup>1</sup>, R<sup>2</sup> and R<sup>5</sup> are independently hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms or -R<sup>8</sup>(OR<sup>9</sup>)<sub>n</sub>OR<sup>10</sup>, R<sup>3</sup> is hydrocarbylene or substituted hydrocarbylene having from 2 to about 18 carbon atoms, R<sup>8</sup> and R<sup>9</sup> are individually hydrocarbylene or substituted hydrocarbylene having from 2 to about 4 carbon atoms, R<sup>4</sup> and R<sup>10</sup> are independently hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, m is 0 or 1, n is an average number from 0 to about 40, and X is -C(O)- or -SO<sub>2</sub>-;

(d) mono- or di-ammonium salts having the formula:



(14)

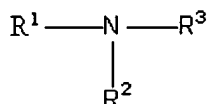
or



(15)

wherein  $\text{R}^1$ ,  $\text{R}^2$ ,  $\text{R}^4$ ,  $\text{R}^5$  and  $\text{R}^7$  are independently hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms or  $-\text{R}^8(\text{OR}^9)_n\text{OR}^{10}$ ,  $\text{R}^6$  is hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms,  $\text{R}^3$  is hydrocarbylene or substituted hydrocarbylene having from 2 to about 30 carbon atoms,  $\text{R}^8$  and  $\text{R}^9$  are individually hydrocarbylene or substituted hydrocarbylene having from 2 to about 4 carbon atoms,  $\text{R}^{10}$  is hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms,  $m$  is 0 or 1,  $n$  is an average number from 0 to about 40,  $\text{X}$  is  $-\text{C}(\text{O})-$  or  $-\text{SO}_2-$ ,  $\text{Z}$  is  $-\text{C}(\text{O})-$ , and  $\text{A}^-$  is an agriculturally acceptable anion;

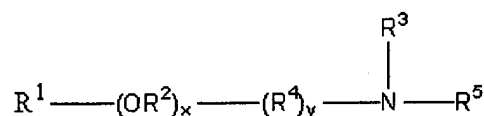
(e) poly(hydroxyalkyl)amines having the formula:



(16)

wherein  $\text{R}^1$  is hydrocarbyl or substituted hydrocarbyl having from about 4 to about 30 carbon atoms or  $-\text{R}^4\text{OR}^5$ ,  $\text{R}^2$  is hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms,  $\text{R}^3$  is hydroxyalkyl, polyhydroxyalkyl, or poly(hydroxyalkyl)alkyl,  $\text{R}^4$  is hydrocarbylene or substituted hydrocarbylene having from 2 to about 18 carbon atoms, and  $\text{R}^5$  is hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms;

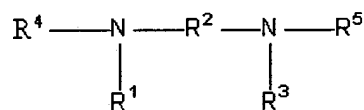
(f) alkoxyated poly(hydroxyalkyl)amines having the formula:



(19)

- wherein  $R^1$  and  $R^3$  are independently hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms,  $R^2$  in each of the  $x$  ( $R^2O$ ) groups is independently  $C_2-C_4$  alkylene;  $R^4$  is hydrocarbylene or substituted hydrocarbylene having from 1 to about 30 carbon atoms,  $R^5$  is hydroxyalkyl, polyhydroxyalkyl, or poly(hydroxyalkyl)alkyl;  $x$  is an average number from 0 to about 30, and  $y$  is 0 or 1;

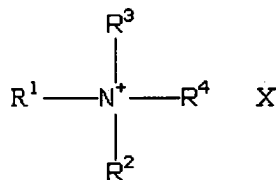
(g) di-poly(hydroxyalkyl)amine having the formula:



(22)

- wherein  $R^1$  and  $R^3$  are independently hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 22 carbon atoms,  $R^2$  is hydrocarbylene or substituted hydrocarbylene having from 2 to about 18 carbon atoms, and  $R^4$  and  $R^5$  are independently hydroxyalkyl, polyhydroxyalkyl, or poly(hydroxyalkyl)alkyl;

(h) quaternary poly(hydroxyalkyl)amine salts having the formula:

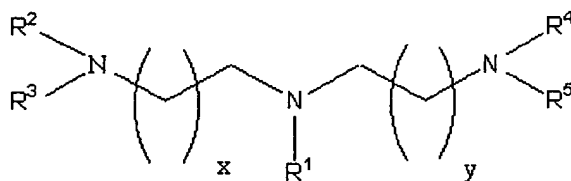


(24)

wherein  $R^1$  is hydrocarbyl or substituted hydrocarbyl having from about 4 to about 30 carbon atoms or  $-X_m-(R^4O)_yR^5$ ,  $R^2$  and  $R^3$  are independently hydrogen or hydrocarbyl

or substituted hydrocarbyl having from 1 to about 30 carbon atoms,  $R^4$  is hydroxyalkyl, polyhydroxyalkyl, or poly(hydroxyalkyl)alkyl, X- is an agriculturally acceptable anion;  $R^4$  in each of the  $y(R^4O)$  groups is independently  $C_2-C_4$  alkylene;  $R^5$  is hydrogen or a linear or branched alkyl group having 1 to about 4 carbon atoms; X is hydrocarbylene or substituted hydrocarbylene having from 2 to about 18 carbon atoms; m is 0 or 1; and y is an average number from 0 to about 30;

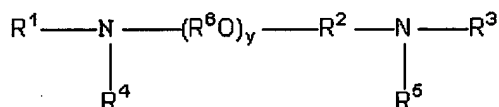
(i) triamines having the formula:



(27)

wherein  $R^1$  is hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms;  $R^2$ ,  $R^3$ ,  $R^4$  and  $R^5$  are independently hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, or  $-(R^6)_s(R^7O)_nR^6$ ;  $R^6$  is hydrogen or a linear or branched alkyl group having from 1 to about 4 carbon atoms,  $R^7$  in each of the  $n(R^7O)$  groups is independently  $C_2-C_4$  alkylene;  $R^8$  is hydrocarbylene or substituted hydrocarbylene having from 1 to about 6 carbon atoms, n is an average number from 1 to about 10, s is 0 or 1, and x and y are independently an integer from 1 to about 4;

(j) diamines having the formula:

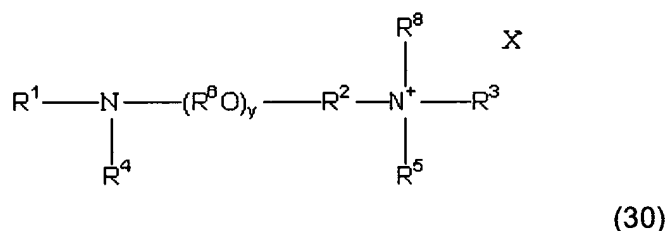


(28)

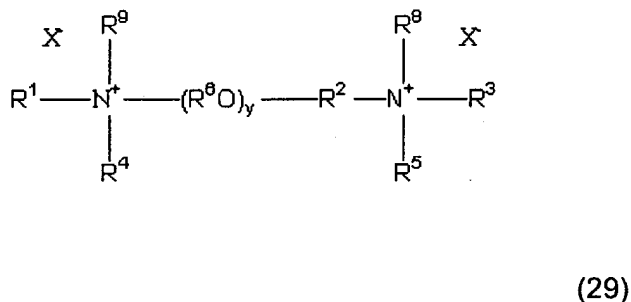
wherein  $R^1$ ,  $R^3$ ,  $R^4$  and  $R^5$  are independently hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, or  $-(R^6O)_xR^7$ ,  $R^2$  is

hydrocarbylene or substituted hydrocarbylene having from 2 to about 30 carbon atoms,  $C(=NR^{11})NR^{12}R^{13}$ -,  $-C(=O)NR^{12}R^{13}$ -,  $-C(=S)NR^{12}R^{13}$ -,  $-C(=NR^{12})$ -,  $-C(S)$ -, or  $-C(O)$ -,  $R^6$  in each of the  $x$  ( $R^6O$ ) and  $y$  ( $R^6O$ ) groups is independently  $C_2$ - $C_4$  alkylene,  $R^7$  is hydrogen, or a linear or branched alkyl group having from 1 to about 30 carbon atoms,  $R^{11}$ ,  $R^{12}$  and  $R^{13}$  are hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms,  $x$  is an average number from 1 to about 50, and  $y$  is an average number from 0 to about 60;

(k) mono- or di-quaternary ammonium salts having the formula:



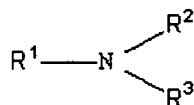
10 or



wherein  $R^1$ ,  $R^3$ ,  $R^4$ ,  $R^5$ ,  $R^8$  and  $R^9$  are independently hydrogen, polyhydroxyalkyl, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, or  $-(R^6O)_xR^7$ ,  $R^2$  is hydrocarbylene or substituted hydrocarbylene having from 2 to about 30 carbon atoms,  $R^6$  in each of the  $x$  ( $R^6O$ ) and  $y$  ( $R^6O$ ) groups is independently  $C_2$ - $C_4$  alkylene,  $R^7$  is hydrogen, or a linear or branched alkyl group having from 1 to about 4 carbon atoms,  $x$  is an average number from 1 to about 30,  $y$  is an average number from about 3 to about 60, and  $X^-$  is an agriculturally acceptable anion;

(l) a secondary or tertiary amine having the formula:

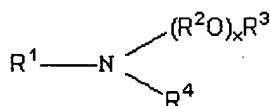




(31)

wherein R<sup>1</sup> and R<sup>2</sup> are hydrocarbyl having from 1 to about 30 carbon atoms, and R<sup>3</sup> is hydrogen or hydrocarbyl having from 1 to about 30 carbon atoms;

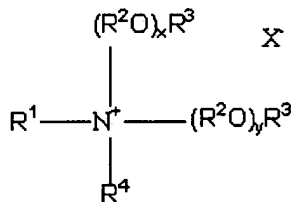
(m) monoalkylated amines having the formula:



(32)

wherein R<sup>1</sup> and R<sup>4</sup> are independently hydrocarbyl or substituted hydrocarbyl groups having from 1 to about 30 carbon atoms or -R<sup>5</sup>SR<sup>6</sup>, R<sup>2</sup> in each of the x (R<sup>2</sup>O) groups is independently C<sub>2</sub>-C<sub>4</sub> alkylene, R<sup>3</sup> is hydrogen, or a linear or branched alkyl group having from 1 to about 4 carbon atoms, R<sup>5</sup> is a linear or branched alkyl group having from about 6 to about 30 carbon atoms, R<sup>6</sup> is a hydrocarbyl or substituted hydrocarbyl group having from 4 to about 15 carbon atoms and x is an average number from 1 to about 60;

(n) dialkoxylated quaternary ammonium salts having the formula:

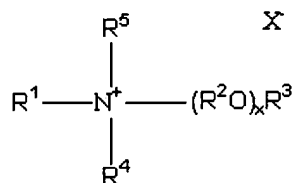


(33)

wherein R<sup>1</sup> is hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, R<sup>2</sup> in each of the x (R<sup>2</sup>O) and y (R<sup>2</sup>O) groups is independently C<sub>2</sub>-C<sub>4</sub>

alkylene,  $R^3$  is hydrogen, or a linear or branched alkyl group having from 1 to about 4 carbon atoms,  $R^4$  is hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms,  $x$  and  $y$  are independently an average number from 1 to about 40, and  $X^-$  is an agriculturally acceptable anion;

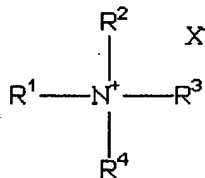
- 5 (o) monoalkoxylated quaternary ammonium salts having the formula:



(34)

- 10 wherein  $R^1$  and  $R^5$  are independently hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms,  $R^4$  is hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms,  $R^2$  in each of the  $x$  ( $R^2O$ ) groups is independently  $C_2$ - $C_4$  alkylene,  $R^3$  is hydrogen, or a linear or branched alkyl group having from 1 to about 30 carbon atoms,  $x$  is an average number from 1 to about 60, and  $X^-$  is an agriculturally acceptable anion;

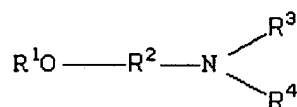
- (p) quaternary ammonium salts having the formula:



(35)

- 15 wherein  $R^1$ ,  $R^3$  and  $R^4$  are independently hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms,  $R^2$  is hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, and  $X^-$  is an agriculturally acceptable anion;

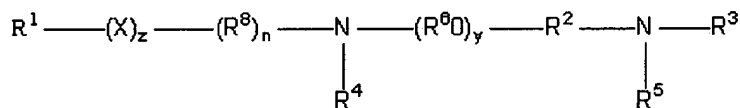
- (q) etheramines having the formula:



(36)

wherein  $\text{R}^1$  is hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms;  $\text{R}^2$  is hydrocarbylene or substituted hydrocarbylene having from 2 to about 30 carbon atoms;  $\text{R}^3$  and  $\text{R}^4$  are independently hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, or  $-(\text{R}^5\text{O})_x\text{R}^6$ ,  $\text{R}^5$  in each of the  $x(\text{R}^5\text{O})$  groups is independently  $\text{C}_2\text{-C}_4$  alkylene,  $\text{R}^6$  is hydrogen, or a linear or branched alkyl group having from 1 to about 4 carbon atoms, and  $x$  is an average number from 1 to about 50;

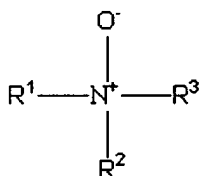
(r) diamines having the formula:



(37)

wherein  $\text{R}^1$ ,  $\text{R}^3$ ,  $\text{R}^4$  and  $\text{R}^5$  are independently hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, or  $-(\text{R}^6\text{O})_x\text{R}^7$ ;  $\text{R}^2$  and  $\text{R}^8$  are independently hydrocarbylene or substituted hydrocarbylene having from 2 to about 30 carbon atoms,  $\text{R}^6$  in each of the  $x(\text{R}^6\text{O})$  and  $y(\text{R}^6\text{O})$  groups is independently  $\text{C}_2\text{-C}_4$  alkylene,  $\text{R}^7$  is hydrogen, or a linear or branched alkyl group having from 1 to about 30 carbon atoms,  $x$  is an average number from 1 to about 30,  $\text{X}$  is  $-\text{O}-$ ,  $-\text{N}(\text{R}^6)-$ ,  $-\text{C}(\text{O})-$ ,  $-\text{C}(\text{O})\text{O}-$ ,  $-\text{OC}(\text{O})-$ ,  $-\text{N}(\text{R}^9)\text{C}(\text{O})-$ ,  $-\text{C}(\text{O})\text{N}(\text{R}^9)-$ ,  $-\text{S}-$ ,  $-\text{SO}-$ , or  $-\text{SO}_2-$ ,  $y$  is 0 or an average number from 1 to about 30,  $n$  and  $z$  are independently 0 or 1, and  $\text{R}^9$  is hydrogen or hydrocarbyl or substituted hydrocarbyl;

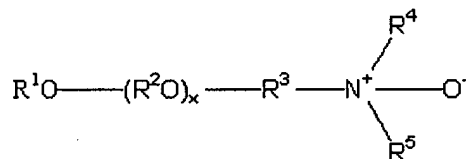
(s) amine oxides having the formula:



(38)

wherein  $\text{R}^1$ ,  $\text{R}^2$  and  $\text{R}^3$  are independently hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms,  $-(\text{R}^4\text{O})_x\text{R}^5$ , or  $-\text{R}^6(\text{OR}^4)_x\text{OR}^5$ ;  $\text{R}^4$  in each of the  $x$  ( $\text{R}^4\text{O}$ ) groups is independently  $\text{C}_2\text{-C}_4$  alkylene,  $\text{R}^5$  is hydrogen, or a hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms,  $\text{R}^6$  is a hydrocarbylene or substituted hydrocarbylene having from 1 to about 6 carbon atoms,  $x$  is an average number from 1 to about 50, and the total number of carbon atoms in  $\text{R}^1$ ,  $\text{R}^2$  and  $\text{R}^3$  is at least 8;

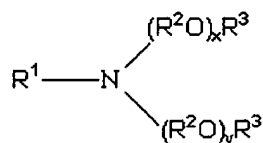
(t) alkoxyated amine oxides having the formula:



(39)

wherein  $\text{R}^1$  is hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms;  $\text{R}^2$  in each of the  $x$  ( $\text{R}^2\text{O}$ ) and  $y$  ( $\text{R}^2\text{O}$ ) groups is independently  $\text{C}_2\text{-C}_4$  alkylene;  $\text{R}^3$  is a hydrocarbylene or substituted hydrocarbylene having from 2 to about 6 carbon atoms;  $\text{R}^4$  and  $\text{R}^5$  are each independently hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms,  $-(\text{R}^6)_n - (\text{R}^2\text{O})_y\text{R}^7$ ;  $\text{R}^6$  is hydrocarbylene or substituted hydrocarbylene containing from 1 to about 6 carbon atoms,  $\text{R}^7$  is hydrogen or a linear or branched alkyl group having 1 to about 4 carbon atoms,  $n$  is 0 or 1, and  $x$  and  $y$  are independently an average number from 1 to about 60;

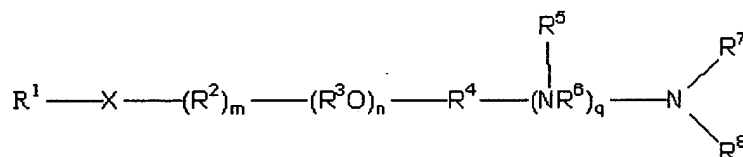
(u) dialkoxyated amines having the formula:



(40)

wherein R<sup>1</sup> is hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, -R<sup>4</sup>SR<sup>5</sup>, or -(R<sup>2</sup>O)<sub>z</sub>R<sup>3</sup>, R<sup>2</sup> in each of the x (R<sup>2</sup>O), y (R<sup>2</sup>O) and z (R<sup>2</sup>O) groups is independently C<sub>2</sub>-C<sub>4</sub> alkylene, R<sup>3</sup> is hydrogen, or a linear or branched alkyl group having from 1 to about 22 carbon atoms, R<sup>4</sup> is a linear or branched alkyl group having from about 6 to about 30 carbon atoms, R<sup>5</sup> is a linear or branched alkyl group having from about 4 to about 15 carbon atoms, and x, y and z are independently an average number from 1 to about 40, provided, however, that when R<sup>1</sup> is alkyl, either the sum of x and y is greater than 20 or R<sup>3</sup> is other than hydrogen;

(v) aminated alkoxyated alcohols having the following chemical structure:

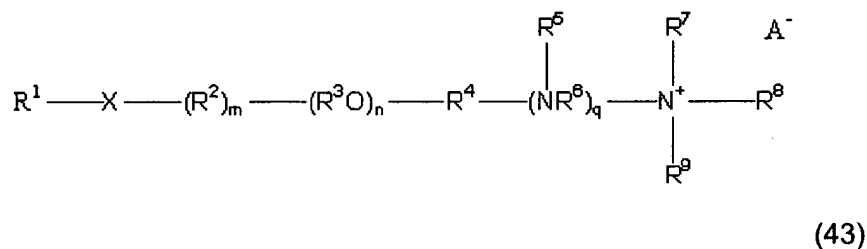


(41)

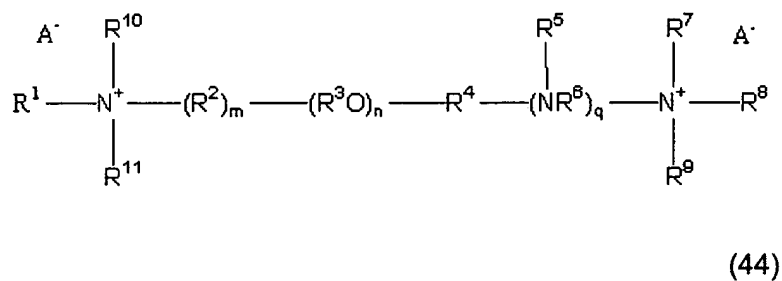
wherein R<sup>1</sup>, R<sup>7</sup>, R<sup>8</sup>, and R<sup>9</sup> are each independently hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, or -(R<sup>11</sup>)<sub>s</sub>(R<sup>3</sup>O)<sub>v</sub>R<sup>10</sup>; X is -O-, -OC(O)-, -C(O)O-, -N(R<sup>12</sup>)C(O)-, -C(O)N(R<sup>12</sup>)-, -S-, -SO-, -SO<sub>2</sub>- or -N(R<sup>9</sup>)-; R<sup>3</sup> in each of the n (R<sup>3</sup>O) groups and the v (R<sup>3</sup>O) groups is independently C<sub>2</sub>-C<sub>4</sub> alkylene; R<sup>10</sup> is hydrogen, or a linear or branched alkyl group having from 1 to about 30 carbon atoms; n is an average number from 1 to about 60; v is an average number from 1 to about 50; R<sup>2</sup> and R<sup>11</sup> are each independently hydrocarbylene or substituted hydrocarbylene having from 1 to about 6 carbon atoms; R<sup>4</sup> is hydrocarbylene or substituted hydrocarbylene having from 2 to about 6 carbon atoms; R<sup>12</sup> is hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to

about 30 carbon atoms; m and s are each independently 0 or 1; R<sup>6</sup> is hydrocarbylene or substituted hydrocarbylene having from 2 to about 30 carbon atoms, -C(=NR<sup>12</sup>)-, -C(S)-, or -C(O)-; q is an integer from 0 to 5; and R<sup>5</sup> is hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms;

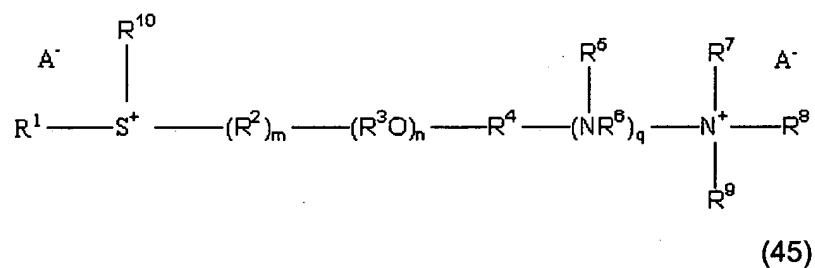
- 5 (w) a quaternary ammonium, sulfonium or sulfoxonium salt having the following chemical structure:



or

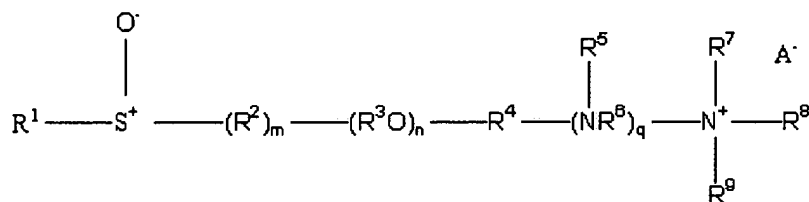


or



or

F06T11/2533660

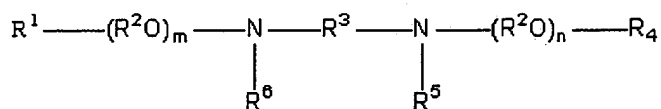


5

(46)

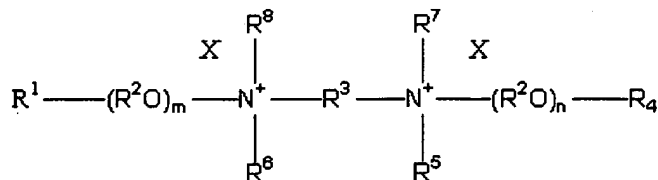
wherein  $\text{R}^1$ ,  $\text{R}^7$ ,  $\text{R}^8$ ,  $\text{R}^9$ ,  $\text{R}^{10}$  and  $\text{R}^{11}$  are independently hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, or  $-(\text{R}^{13})_s(\text{R}^3\text{O})_v\text{R}^{12}$ ; X is -O-, -OC(O)-, -N( $\text{R}^{14}$ )C(O)-, -C(O)N( $\text{R}^{14}$ )-, -C(O)O-, or -S-;  $\text{R}^3$  in each of the n ( $\text{R}^3\text{O}$ ) groups and v ( $\text{R}^3\text{O}$ ) groups is independently  $\text{C}_2$ - $\text{C}_4$  alkylene;  $\text{R}^{12}$  is hydrogen, or a linear or branched alkyl group having from 1 to about 30 carbon atoms; n is an average number from 1 to about 60; v is an average number from 1 to about 50;  $\text{R}^2$  and  $\text{R}^{13}$  are each independently hydrocarbylene or substituted hydrocarbylene having from 1 to about 6 carbon atoms; m and s are each independently 0 or 1;  $\text{R}^4$  is hydrocarbylene or substituted hydrocarbylene having from 2 to about 6 carbon atoms;  $\text{R}^6$  is hydrocarbylene or substituted hydrocarbylene having from 2 to about 30 carbon atoms, -C(=NR<sup>12</sup>)-, -C(S)-, or -C(O)-;  $\text{R}^{14}$  is hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, q is an integer from 0 to 5;  $\text{R}^5$  is hydrogen or hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms; and each A<sup>-</sup> is an agriculturally acceptable anion;

(x) a diamine or diammonium salt having the formula:



(47)

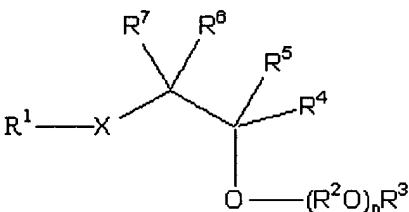
or



(48)

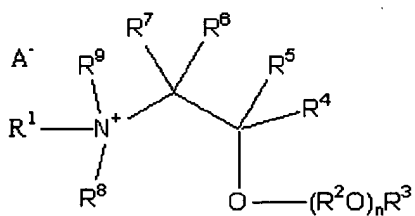
5

(y) a compound of the formula:



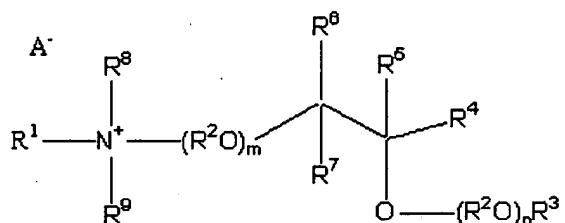
(52)

or



(53)

**or**



(56)

or

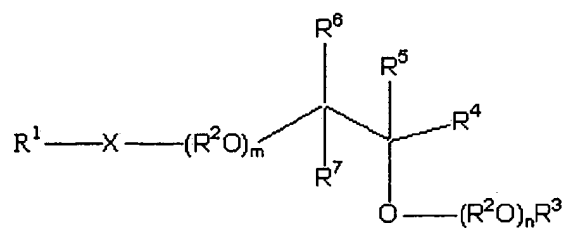
[illegible]



(MTC 6801)

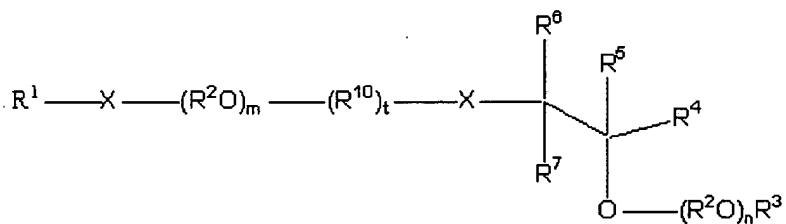
308

39-21(52580)  
PATENT



(54)

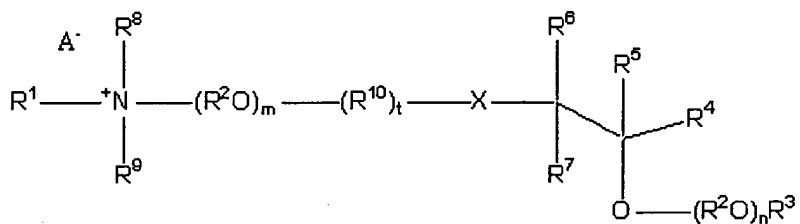
or



(55)

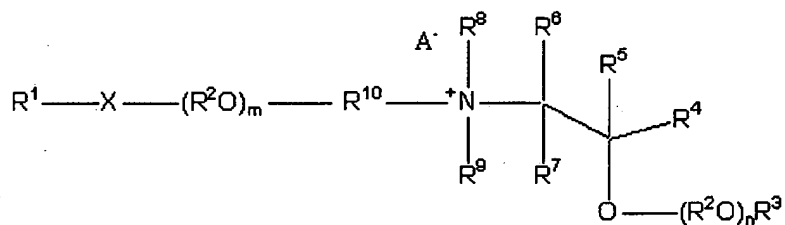
5

or



(57)

or

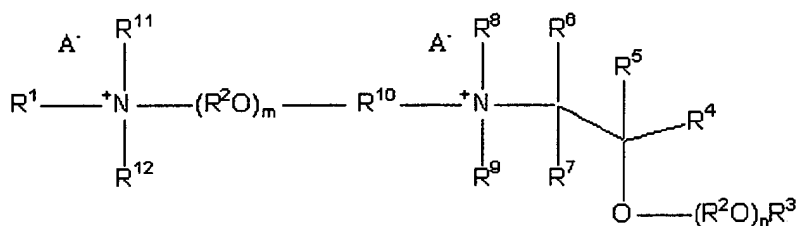


(58)

10

or

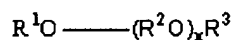
For 2568860



(59)

wherein R<sup>1</sup>, R<sup>9</sup>, and R<sup>12</sup> are independently hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, or -(R<sup>2</sup>O)<sub>p</sub>R<sup>13</sup>; R<sup>2</sup> in each of the m (R<sup>2</sup>O), n (R<sup>2</sup>O), p (R<sup>2</sup>O) and q (R<sup>2</sup>O) groups is independently C<sub>2</sub>-C<sub>4</sub> alkylene; R<sup>3</sup>, R<sup>8</sup>, R<sup>11</sup>, R<sup>13</sup> and R<sup>15</sup> are independently hydrogen, or a hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms; R<sup>4</sup> is -(CH<sub>2</sub>)<sub>y</sub>OR<sup>13</sup> or -(CH<sub>2</sub>)<sub>y</sub>O(R<sup>2</sup>O)<sub>q</sub>R<sup>3</sup>; R<sup>5</sup>, R<sup>6</sup> and R<sup>7</sup> are independently hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, or R<sup>4</sup>; R<sup>10</sup> is hydrocarbylene or substituted hydrocarbylene having from 2 to about 30 carbon atoms; R<sup>14</sup> is hydrogen, hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, or -(CH<sub>2</sub>)<sub>z</sub>O(R<sup>2</sup>O)<sub>p</sub>R<sup>3</sup>; m, n, p and q are independently an average number from 1 to about 50; X is independently -O-, -N(R<sup>14</sup>)-, -C(O)-, -C(O)O-, -OC(O)-, -N(R<sup>15</sup>)C(O)-, -C(O)N(R<sup>15</sup>)-, -S-, -SO-, or -SO<sub>2</sub>-; t is 0 or 1; A- is an agriculturally acceptable anion; and y and z are independently an integer from 0 to about 30.

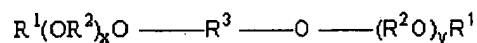
122. The composition of claim 101 wherein said nonionic surfactant comprises  
(a) an alkoxyated alcohol having the formula:



(49)

wherein R<sup>1</sup> is hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, R<sup>2</sup> in each of the x (R<sup>2</sup>O) groups is independently C<sub>2</sub>-C<sub>4</sub> alkylene, R<sup>3</sup> is hydrogen, or a linear or branched alkyl group having from 1 to about 4 carbon atoms, and x is an average number from 1 to about 60;

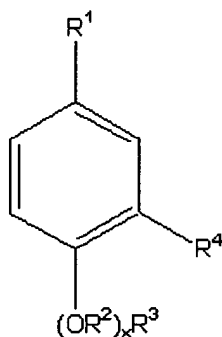
(b) dialkoxylated alcohols having the formula:



(50)

wherein  $R^1$  is independently hydrogen, or a linear or branched alkyl group having from 1 to about 4 carbon atoms,  $R^2$  in each of the  $x$  ( $R^2O$ ) and the  $y$  ( $R^2O$ ) groups is independently  $C_2-C_4$  alkylene,  $R^3$  is hydrocarbylene or substituted hydrocarbylene having from 2 to about 30 carbon atoms, and  $x$  and  $y$  are independently an average number from 1 to about 60; or

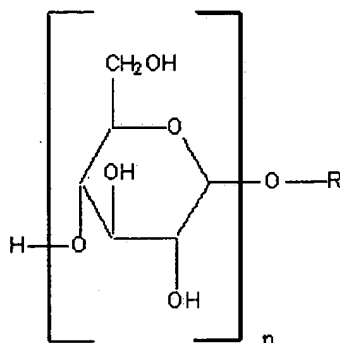
(c) alkoxyated dialkylphenols having the formula:



(51)

wherein  $R^1$  and  $R^4$  are independently hydrogen, or a linear or branched alkyl group having from 1 to about 30 carbon atoms and at least one of  $R^1$  and  $R^4$  is an alkyl group,  $R^2$  in each of the  $x$  ( $R^2O$ ) groups is independently  $C_2-C_4$  alkylene,  $R^3$  is hydrogen, or a linear or branched alkyl group having from 1 to about 4 carbon atoms, and  $x$  is an average number from 1 to about 60; or

(d) a glycoside having the formula:



(61)

wherein  $n$  is the degree of polymerization, or number of glucose groups, and  $R$  is a branched or straight chain alkyl group preferably having from 4 to 18 carbon atoms, or a mixture of alkyl groups having an average value within the given range.

123. A temperature stable uniform liquid herbicidal concentrate comprising:  
an aqueous phase having a water soluble herbicide dissolved therein, the water soluble herbicide being present in a concentration that is biologically effective when the composition is diluted in a suitable volume of water and applied to the foliage of a susceptible plant;

an oil phase intimately and uniformly mixed with said aqueous phase, said oil phase comprising a substantially water immiscible organic solvent; and

a surfactant component comprising a cationic surfactant and a nonionic surfactant, the surfactant component being present in a concentration sufficient to maintain the stability of the concentrate between a cloud point of at least about 50 C and a crystallization point not greater than about -10 C.

124. A composition of claim 123 wherein the composition is an optically transparent stable concentrate.

125. The composition of claim 123 wherein the concentrate is a microemulsion.